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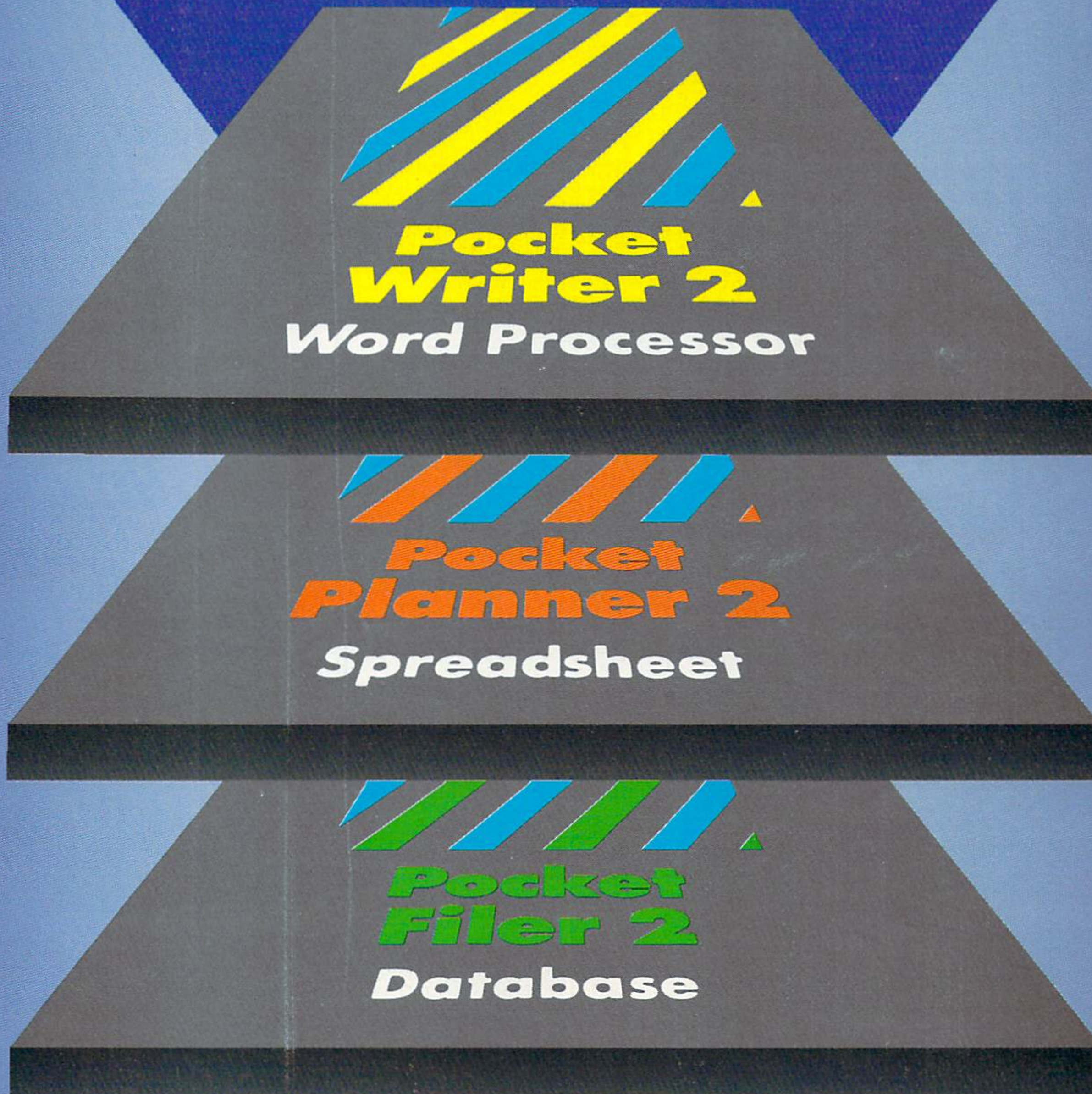
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VOLUME 8, NUMBER 3

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commodore MAGAZINE

DEPARTMENTS

FEATURES



Magazine Entry Program

To the Editor:

While lounging around this evening and thumbing through a back issue of *Commodore Magazine*, I ran across an article of which I had not read closely before. I am referring to the October, 1986, issue of *Commodore Magazine*, page 118, titled How to Enter Programs. In reading this article, my eyes were drawn to the section entitled OUT OF DATA ERROR. This made me think that maybe I could offer a suggestion to the fellow Commodore 64 programmers of the world.

In the article, it says "Reading data from a page of a magazine can be a strain on the brain, so use a ruler or a piece of paper or anything else to help you keep track of where you are as you enter data."

First, let me say that I have had the same experiences with entering data on my Commodore 64 and it can be a very frustrating thing to say the least. My suggestion is to use a tape recorder—not one that is expensive, just easy to operate and with good clarity. What is involved is not difficult and at most about the same amount of time will be spent with the recorder as going back and correcting mistakes or finding them. Here is a small program off the top of my head to illustrate how it is done.

10 PRINT-quotation-HELP FOR FEWER MISTAKES-quotation-enter
20 FOR-X-equals-ONE TO ONE THOUSAND-colon-NEXT-enter
30 PRINT-CHR-STRING-parenthesis-ONE-FOUR-SEVEN-parenthesis-enter
40 CT-EQUALS-ZERO-enter
50 PRINT-quotation-HOW WONDERFUL THIS IS-quotation-enter
60 CT-EQUALS-CT-PLUS-ONE
70 IF-CT-IS-LESS-THAN-EIGHT-THEN-FIFTY-enter

The hyphens have no real meaning other than pauses in your voice while recording the program. What is in all capital letters is the actual program, while lower-case print is the symbol which is spoken into the recorder. Sit down one night and speak the program into the recorder and then the next day start the recorder and type what you hear. Remember to speak slowly enough to ensure that you will not fall behind while typing. I think you will be impressed with the results.

Michael Wyatt
Sheridan, Wyoming

Game Port Tutorial

To the Editor:

I read with much interest the Game Port Tutorial, Part 1 (Technical Tips in September/October, 1986). However, it appears that there is a problem with Listing 2 Modifications. In line 157, the second poke, POKE S+4, 33 was meant to select a sawtooth waveform and open the gate of voice 1. This appears to be a problem as then the gate would be strictly open all the time. Apparently the gate needs to be closed and reopened each time the frequency command registers are changed. To make the SID output a tone, I removed the second poke from line 157 and put it on a line 216 POKE S+4,33:POKE S+4,32 thus closing the gate to wait for the next tone. This seems to fix the problem.

R.E. Lyon
Granada Hills, California

Disk Flipping

To the Editor:

In the January, 1987, issue, in Tips and Tricks, there was an article called Disk Flipping by Kathleen Mead. I would like to submit a much easier way to notch the disk—a method my son told me, which I have used for a few years.

Using another disk as a template, place it back to back with the disk you wish to cut the other write protect notch. Care should be taken that both disks are in perfect alignment with each other. Take an ordinary paper hole punch, one with about the hole size of notebook paper. (These are available at most any place selling school or stationery supplies for under $2.00.) Slide the punch in the notch of the template until the cutter post touches the inside portion of the template notch and centered. Cut the hole and you're in business with a double sided disk. Takes less than a minute. I have never experienced a failure yet.

Since I am retired and living on a small pension, I am always looking for easy and inexpensive ways of doing things.

George A. Rhoads, Jr.
Boring, Oregon

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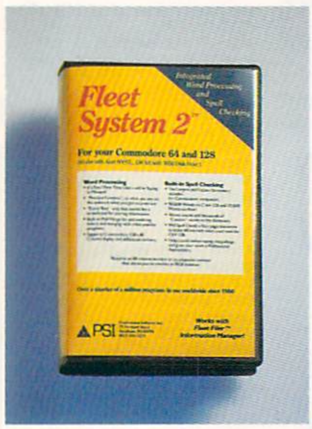
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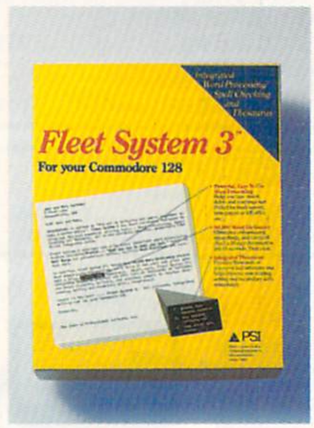
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Take the Chore out of Weekly Grocery Shopping

Kledzik Company has released **Shopping List** for the Commodore 64. **Shopping List** is menu-driven and features 21 "aisles" which allow users to select the names and quantity of items they want to purchase. When the shopper is finished making selections, the printer prints out the results. The program also has a place for users to indicate the items they have coupons for.

Shopping List includes well over 800 of the most popular grocery store items. Also included are two special "aisles" that let users enter their own item names. The first is a "main course" aisle for the names of up to 200 favorite main course dishes. The other is an "extra" aisle for the names of special items not already found in one of the other 19 aisles.

Shopping List retails for $29.95 from Kledzik Company, 25605 Cielo Court, Valencia, CA 91355 (805-254-4720).

Aliens

With Activision's **Aliens: The Computer Game**, Commodore 64 users can live the thriller that has terrified more than 25 million movie-goers since Aliens was released by Twentieth Century Fox in the summer of 1986.

Aliens: The Computer Game recreates all of the elements that made the motion picture such a success. After your harrowing flight to the surface of LV-426, alien attackers come at you from the dark pathways of the Atmosphere Processor through the breached Operations Room to the final confrontation with the Alien Queen.

Simulating the movie's struggle against mankind's ultimate foe, the game features six game segments which tie closely to the movie's storyline and action.

Aliens: The Computer Game was created by a team of designers lead by Steve Cartwright, creator of **Hacker** and **Hacker II**. The game retails for $34.95 from Activision, 2350 Bayshore Parkway, Mountain View, CA 94043 (415-960-0410).

Wargame Construction Set

Strategic Simulations has released **Wargame Construction Set** for the Commodore 64, a game that lets players create war, science fiction and fantasy games.

Weapons and firepower, fighting units and troop movement are just some of the elements players can control. Gamers also have control over terrain, including scale and placement of roads, rivers, bridges, woods, buildings and mines. A tutorial is included for the novice.

The game offers eight pre-designed scenarios. These include battles from the Civil War and World War II, a contemporary hostage rescue, a futuristic battle with alien forces, a medieval castle seige, and a World War III battle in Germany. **Wargame Construction Set** retails for $29.95 from Strategic Simulations, 1046 N. Rengstorff Avenue, Mountain View, CA 94043 (415-964-1353).

Dr. Ruth's Game of Good Sex

After years of dispensing good advice about sexuality on the airwaves, Dr. Ruth Westheimer is bringing her unique blend of candor, humor and common-sense practicality to the Commodore 64 in Avalon Hill Game Company's **Dr. Ruth's Computer Game of Good Sex.**

In the game, one to seven people answer questions about love, relationships and (of course) good sex. Successful answers score points and allow the player to advance to the bonus round called the Sex Clinic. There the player hears an actual case history as told to Dr. Ruth and must choose the correct answer from four possible responses. The game contains over 800 questions and features a variable time clock (for handicapping better players) and a high score table.

Dr. Ruth's Computer Game of Good Sex retails for $29.95 from Avalon Hill Game Company, 4517 Harford Road, Baltimore, MD 21214 (301-254-5300).

Volleyball

Artworx Software has released **Beach Ball Volleyball** for the Commodore 64. Players match their skills against a friend or the computer at any of nine difficulty levels. The game retails for $14.95 from Artworx Software, 150 North Main Street, Fairport, NY 14450 (716-425-2833).

Certificate Maker Library

Springboard has released **Certificate Library Volume 1**, a companion program to Springboard's **Certificate Maker. Certificate Maker** lets users create and print personalized certificates and awards with a Commodore 64.

Certificate Library Volume 1 provides more than 100 new pre-designed certificates and awards. It also features 24 new borders to frame certificates and six dozen new seals and stickers.

Certificate Maker is required to run **Certificate Library Volume 1**, which retails for $34.95 from Springboard Software, 7808 Creekridge Circle, Minneapolis, MN 55435 (612-944-3915).

Greeting Card Maker

Activision's **Greeting Card Maker** creates cards, invitations and announcements for any occasion with a Commodore 64 and printer. It features six different size cards, including three-dimensional pop-

up cards; pictures, designs, clip-art objects and panoramic scenes; two dozen background pat terns and borders; eight type styles, each in upper- and lower-case; and a variety of verses for any occasion.

It also includes an envelope maker, address list and card rack. Packed with the program are 20 sheets of ivory parchment stationery, instructions for ordering additional stationery, and a comprehensive manual.

Greeting Card Maker is available for $34.95 from Activision, 2350 Bayshore Parkway, Mountain View, CA 94043 (415-960-0410).

Choose the Perfect College

Mindscape has released **The Perfect College** for the Commodore 64, a database containing information on more than 1,650 accredited four-year U.S. colleges and universities. Choose up to 26 26 college selection criteria such as cost, location, majors, overall competitiveness, and student/faculty ratio.

The database includes over 440,000 facts to help identify the schools and annual updates insure that the information is current. The program also gives addresses and phone numbers.

The Perfect College retails for $19.95 and is free with the purchase of Mindscape's **The Perfect Score**. (Mindscape, 3444 Dundee Road, Northbrook, IL 60062, 312-480-7667).

Computer Maintenance

Philips ECG has released the Computer Care Kit, a special kit that contains everything needed to properly clean and maintain your computer. Included are PH1700 Computer Anti-Static Spray, PH1800 Computer Glass and Enclosure Cleaner, and PH1100 Jet Air Cleaner. There are also Lint Free Cleaning Swabs, Lint Free Wipes, Floppy Head Disk Cleaners and presaturated Computer Terminal Screen Cleaner Pads.

The kit is available for $39.95 from Philips ECG, P.O. Box 3277, Williamsport, PA 17701. C.O.D. is available by calling toll-free 800-233-8767 (in PA 800-222-9308).

Over 20 Free Programs

Attention all programmers! Watch for the next issue of **Commodore Magazine**—an entire issue of free programs—both games and practical applications—you can type in and use right away. Don't miss it!

Tax Program Update

Take a load off your shoulders this year by letting your computer help with your 1986 taxes.

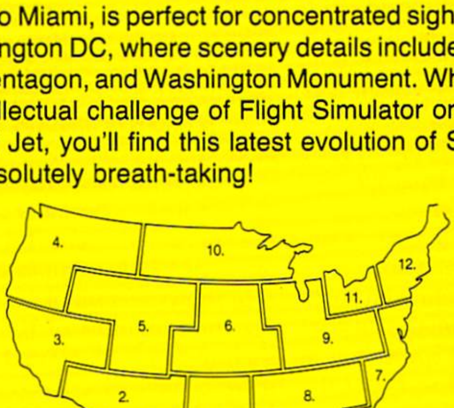
1986 Tax Return Helper	KSoft 845 Wellner Road Naperville, IL 60540 312-961-1250	C64
Tax Master	Master Software 6 Hillery Court Randallstown, MD 21133 301-922-2962	C64
Tax Command	Practical Programs Box 93104 Milwaukee, WI 53203 414-272-7227	C64
Taxaid	Taxaid Software 606 Second Avenue SE Two Harbors, MN 55616 218-834-5012 218-834-3600	C64 C128 Plus/4 VIC 20

And to get a head start on your 1987 and 1988 taxes—

Future Tax	Taxaid Software 606 Second Avenue SE Two Harbors, MN 55616 218-834-5012 218-834-3600	C64 C128 Plus/4

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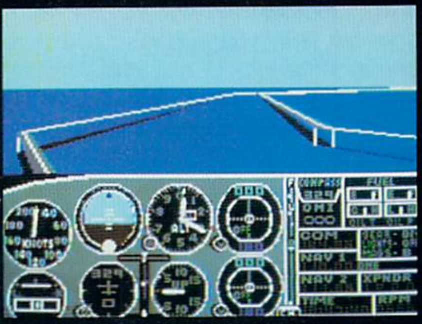


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REVIEWED BY BOB GUERRA

128 Machine Language for Beginners

Author: Richard Mansfield
Publisher: COMPUTE! Books
Box 5406
Greensboro, NC 27403
Price: $16.95

Even if you don't know an accumulator from a status register, Richard Mansfield's *128 Machine Language for Beginners* can help you converse with your Commodore 128 in machine language. Although other books on machine language have been written for the beginner, this is currently the only beginner book aimed directly at the 128 user. It teaches everything you need to know to write 8502 machine code and covers such 128-specific topics as the machine's built-in machine-language monitor, as well as special escape sequences and kernal subroutines which can be incorporated into your own programs.

All you need to get started is a working knowledge of BASIC and several hours to type in the LADS assembler program. The LADS assembler is a label-based programming language that converts easy-to-remember mnemonic instructions (such as LDA for load accumulator) into machine code that your computer can understand. The assembler is needed to type in the book's example routines.

Before you can type LADS into your 128, however, you'll have to enter MLX, a BASIC program that eliminates typing errors when entering LADS. Even before typing MLX, though, you may want to enter a short program called Automatic Proofreader that can make the typing of MLX go a lot smoother. On the other hand, you may decide to skip the typing altogether and send $12.95 to COMPUTE! for the LADS companion disk that contains not only the assembler, but several of the book's sample machine-language programs as well.

Once you've acquired a working copy of LADS, you can now begin. After a short preface describing the uses of machine-language programming and its advantages over BASIC, the first couple of chapters explain how to use the book together with the LADS assembler. Also included is a discussion of numbering systems and the relationships among binary, hex and decimal.

This book is currently the only beginner book written exclusively for 128 users.

Chapter three is an in-depth look at the 128's built-in machine-language monitor and explains in simple terms the functions of 16 special monitor commands. A thorough discussion of disassembly shows you how to use the monitor as a debugging tool. A short disassembly of a machine-language program containing a couple of bugs is included, and by finding the errors, you begin to get a feel for the way machine-language programs are constructed. You are simultaneously introduced to the hazards of getting addressing modes mixed up.

Chapter four deals exclusively with the 8502's 13 addressing modes. Instead of covering every type of addressing in depth, however, Mansfield sorts out the most significant modes. As a result, only the six most useful modes are described in detail, and the reader is encouraged to become more familiar with these by practicing them.

This method of selective instruction is used again in the fifth chapter, which concerns machine-language arithmetic. In the very first paragraph, Mansfield explains that although machine language is useful for many applications, advanced mathematics isn't one of them. He further suggests that any programs involving trigonometry or quadratic equations should be written in BASIC. As a result, the chapter covers addition, subtraction and comparison of numbers, as well as the way your 128 interprets numbers and tells the difference between numbers representing instructions and those meant as actual values.

Similarly, chapter six covers the 8502's instruction set and mentions most of the 56 available commands, but only the 30 most widely used instructions are discussed at length. These are conveniently divided into six groups according to the functions they perform. Arranged in this manner, the chapter not only makes learning the use of each command easier, but also serves as a handy reference guide for the beginning programmer.

Chapter seven deals with the ways in which your machine-language programs can borrow from BASIC by using the computer's built-in subroutines. Here Mansfield points out the advantages of not having to rewrite complex routines. But he does warn that programs that borrow heavily from their computer's ROM operating system can't be easily translated for other computers.

By the eighth chapter you'll be ready to combine what you've learned to construct a simple machine-language program that can search through selected areas of memory for specific strings. Besides the program listing and an explanation of the logic behind its construction, the chapter also includes a discussion on "safe" sections of memory where you can store your machine-language programs.

Perhaps the best chapter in the book, at least from a beginner's standpoint, is the ninth—Machine Language Equivalents of BASIC Commands. Here Mansfield shows you simple ways of duplicating the functions of BASIC keywords such as INPUT, PRINT and TAB, as well as more complex BASIC constructions like FOR-NEXT loops, IF-THEN conditional statements, and ON-GOTO. Although there are often several ways of duplicating the same BASIC function, the routines provided are easy to understand and program.

After a short chapter specifically about the 128's special features (escape codes, memory banks, FAST mode), the final chapter explains how to use many of the computer's built-in kernal routines for things like input/output operations, printing, customizing function keys, and switching to 64 mode. This is followed by seven appendices, which include a complete reference guide for the 8502 instruction set, detailed explanations of how to use the LADS assembler, the 128 memory map, a half-dozen useful machine-language subroutines for manipulating numbers, and a list of Commodore ASCII codes.

The book gives the beginner everything he needs to program in machine language. I only hope that Mansfield will write a sequel for those of us who are interested in a chapter or two on uses of machine language in sound and graphics!

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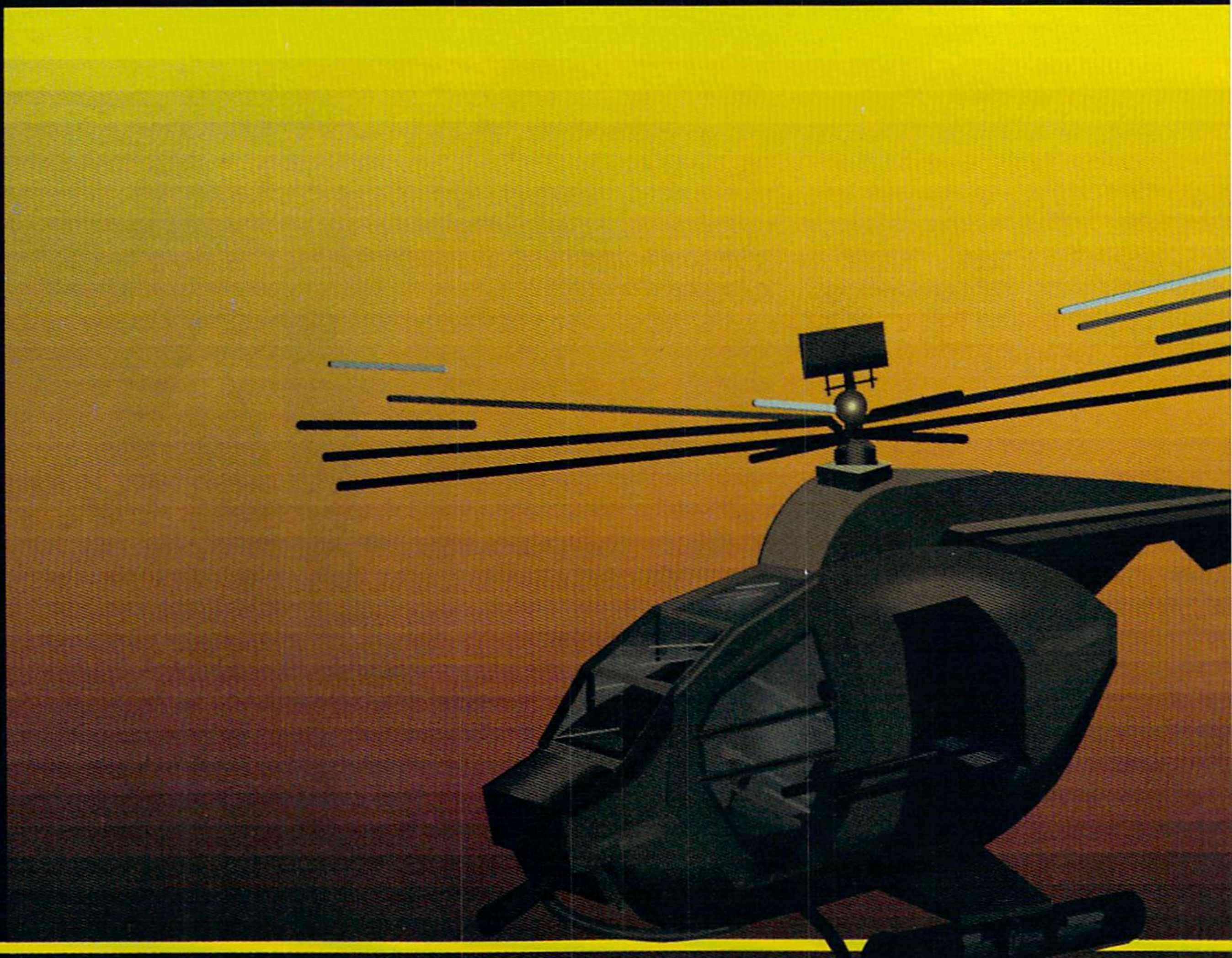
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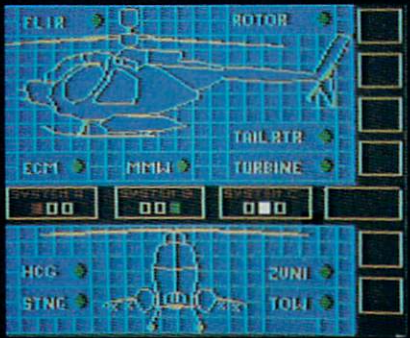
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In a market full of helicopter simulations like Super Huey II, Gunship, and Infiltrator, it's nice to find a product like ThunderChopper that flies high above the rest!

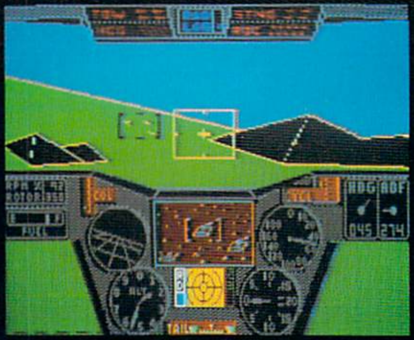
Colonel Jack Rosenow USAF (Ret.), President of ActionSoft Corp., has the experience to provide all of the helicopter action and strategy you've been looking for! ThunderChopper incorporates the most advanced graphics, flight systems, and game-playing factors to provide a sensational balance of strategy and fun:



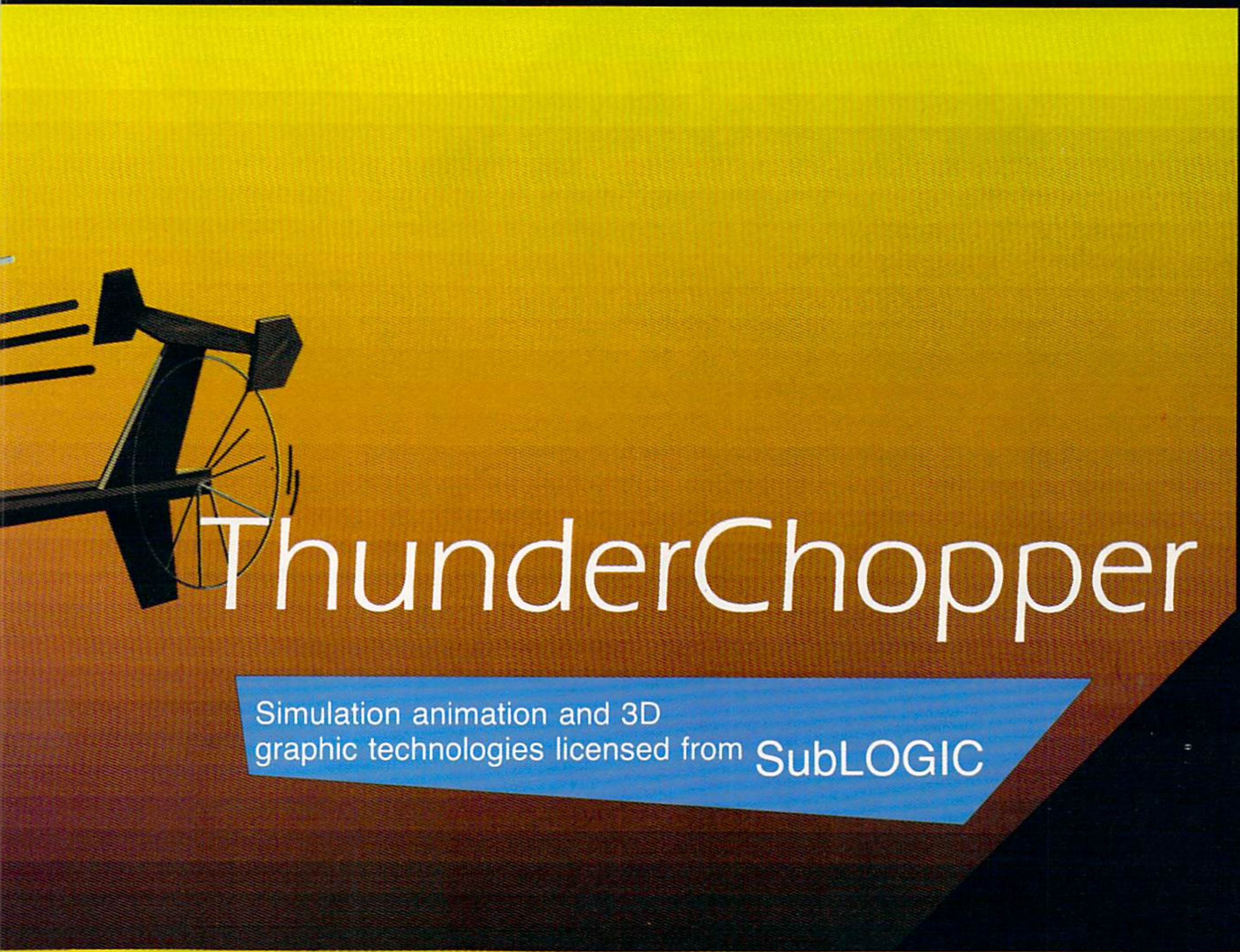
- Action-packed animated graphics include real 3D scenery and airborne threats. The competition's graphics just don't compare.

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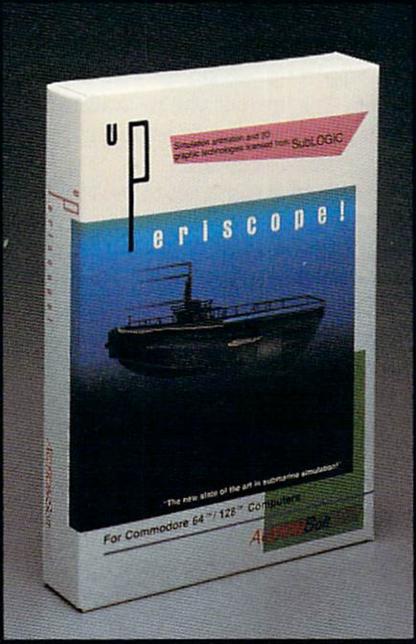
As Colonel Jack says: "ThunderChopper is the ultimate in helicopter action and realism. Nothing else even comes close. No other simulation can boast this much fun!"



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S I L I C O N V A L L E Y I N S I D E R

BY MATTHEW LEEDS

From Commander Cody to the Perfect College

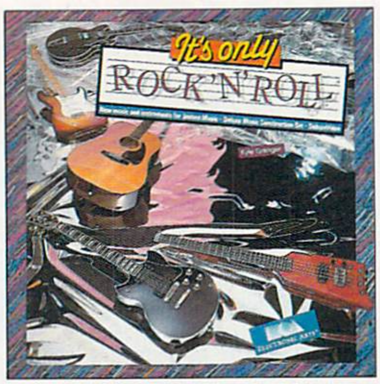
Previews of new products from Silicon Valley.

It looked like any other package. UPS had delivered it with no special care. It wasn't until I opened it that I found the note and the carefully wrapped sticks of TNT connected to a timer. Uh-oh. . . what story had I leaked too soon? This definitely had my attention.

What I found was a press release from **Accolade,** announcing a new software game, **Killed Until Dead,** for the Commodore 64. It is billed as the first truly interactive text and graphics murder mystery game, featuring over 20 plots. In this game, the player tries to prevent a murder instead of solve one. An unusual concept and an unusual press kit! (P.S.—it was not real TNT.)

Accolade is also working on a football game for the 64. I'll have more details next month.

Activision is upgrading **Music Studio** for the Amiga. The upgrade includes the ability to convert **Music Studio**-format scores into IFF SMUS files, used by most other music programs on the Amiga. This conversion does not move the instruments, just the score information. It also allows the use of SMUS files in **Music Studio.**



The new version also uses IFF-digitized instrument files, along with the internal synthesized instrument files, allowing the creation of a song that uses digitized instruments, synthesized instruments, and MIDI instruments simultaneously. Other additions include the use of all Workbench printer drivers, and support for version 1.2 of the operating system. The upgrade will be available to all **Music Studio** owners by sending in their original disk and ten dollars.

Electronic Arts continues to produce an incredible volume of software for Commodore owners. **Dan Dare, Pilot of the Future** is a return to those comic book heros of the past. Although it will not win any awards for state-of-the-art programming, it is a funny presentation of fifties nostalgia: Dan Dare is a retired hero called back into action to stop the evil Mekon empire from destroying the earth. Imported from England, this game is the first of a new line of low-cost software being introduced by Electronic Arts.

Other goodies for the 64 coming in the next few months include **Instant Music, Sky Fox II, Star Fox** (an outer space shoot-'em-up) and **Pegasus**, a project being worked on in conjunction with Lucasfilm.

Electronic Arts has not forgotten the Amiga. **Quick Type** is a typing tutor with a twist. It's got all the features you would expect: great color graphs that give detail on every aspect of your typing skills, an arcade game for quick reflexes, and customizing capabilities to ensure that you work on your weak areas. But the twist is that as you type along with the text displayed on the screen, you're following the episodes of a soap opera. Guaranteed to hold your interest.

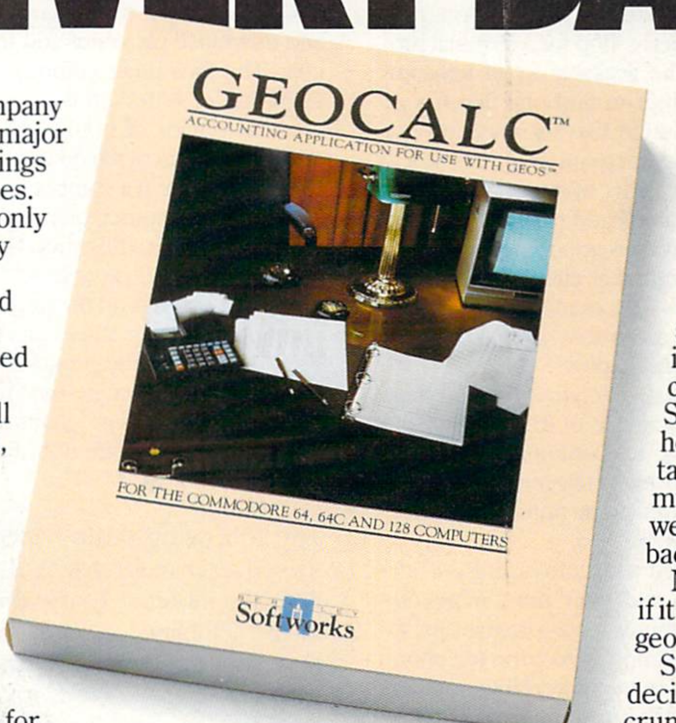
It's Only Rock and Roll is an **Instant Music** data disk with 40 new songs and almost 20 new instruments. The manual will have a discography on the important eras in Rock, chord progressions for every song on the disk, and tips on arrangement, orchestration and jamming.

The **Deluxe Video "Post Production Kit"** is a **Deluxe Video** data disk with new scene generators, new sounds and music, and other goodies guaranteed to give the videophile hunger pains. Of even more interest is the news that a revision of **Deluxe Video** is in the works. It will address many of the user-requested additions to the program.

The new version will feature 320 X 400 mode operations for interlaced output, hard disk and extended memory compatibility, 1.2 operating system compatibility, and smoother movement of objects and text on the screen. Large portions of the code have been rewritten in assembly language to speed things up, and the overall performance is much improved. Electronic Arts has said that

Continued on pg. 126

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geos | file | edit | options | special | display | search | sample

Operating Expenses

	A	B	C	D
4	Operating Expense			
5		January	February	March
6	Raw Materials	11000	11750	10750
7	Manufacturing	15000	14500	14350
8	Rent	4000	4000	4000
9	Labor	20000	20000	21000
10	Utilities	3000	3150	3100
11	Transportation	8000	7800	8000
12	Overseas Shipping	4000	4500	4250
13				
14	Total	65000	65700	65450
15				
16	Grand Total		196150	

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Connect!

A Guide to Telecommunications Literacy

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In part three of our series, we cover some of the more popular features found in telecommunications programs. We will also show how to connect Commodore modems to various Commodore computers through photographs and a reference chart.

An explanation of the features in telecommunications programs are useful so you can properly shop for a terminal program. These features may not be available in all telecommunications programs, but attempt to find one that has all the options you need. Keep in mind that the way you use these features will vary from program to program. These features are not listed in any special order of importance.

The first two features are variable baud rates and user-definable parameters. Variable baud rates are needed if you are using a modem that can be operated at either 300 baud or 1200 baud (the Commodore 1670/Modem 1200, for example). User-definable parameters mean that you can control the settings for parity, stop bits and duplex.

Auto-dialing is a welcome feature, of course, but you must make sure that your modem is capable of it. You enter the number you wish to call and the telecommunications software will do the dialing. More advanced telecommunications programs also have an option to redial the number automatically if it is busy or no one answers.

Another option commonly used with auto-dialing is a telephone directory. This lets you add your most frequently called numbers to the telecommunications program for future use. With this option, you simply select the telephone number you wish to dial from a menu of available numbers and the program auto-dials it. This saves you from entering the number of your favorite bulletin board or data base each time you call.

Some programs allow for programmable keys called macro keys. These keys store names, numbers, or anything else that you wish, for instant recall. This is useful for storing your password and/or user ids that many commercial data bases and bulletin boards systems require.

A built-in buffer (sometimes called a text buffer) is very useful for saving all or part of the information you are viewing on-screen. This information can then be saved to disk (usually in a sequential file) or dumped to your printer if a printer option is available.

Text buffers come in many sizes. The size of a buffer will depend on the amount of available RAM in your computer. For example, the VIC 20 has 3.5K of RAM and the 128 has 128K of RAM. The amount of buffer space will also change from program to program on the same model of computer depending on how the program was written. You will need to know this information to be able to decide if a text buffer is large enough for your application.

Tap into the wealth of information available through telecommunications.

Some programs allow for personal choices of things like screen, border and text colors. These choices are very useful if you have a favorite color combination or are using a black-and-white television as a monitor.

Another useful feature in telecommunications software is its ability to be used with more than one model and brand of modem. This is important if you decide to change models or brands at a later time, and still want to use the same software.

One of the most popular features is the ability to upload and download programs and text files using common protocols. The two most common protocols are XModem and CBM-Punter. XModem is a very popular protocol because almost all brands of home and personal computers have an XModem protocol telecommunications program)—available to them. That is, if a computer of one brand is connected to a computer of another brand, they can transfer a file or program from one to the other. This does not mean that the other computer will be able to run the program. The second computer could send the program to a third computer, and if computer number three was the same make and model as the originator of the program (computer number one), the program could now be run. You can see how this ability to send and store files/programs froehone computer to another (even though they are not of the same make or model) can be very useful. ■

The following table determines which figure you should refer to for your combination of computer, modem and monitor. To use this table, find your computer in the left-hand column, then move across until you find your modem type and, where applicable, your monitor type.

	1600	1650	1660	1660 1902A	1660 1902 8-pin*	1660 1802C 5-pin**	1660 TV	1670
VIC 20	Fig 1	Fig 2	Fig 8					Fig 9
SX-64	Fig 1	N/A	Fig 6					Fig 9
C64	Fig 1	Fig 2		Fig 7	Fig 4	Fig 3	Fig 5	Fig 9
C128	Fig 1	Fig 2		Fig 7	Fig 4	Fig 3	Fig 5	Fig 9
Plus/4	N/A	N/A		Fig 7	Fig 4	Fig 3	Fig 5	Fig 9

N/A This combination is not recommended and may cause damage to you modem and/or computer.

* This applies to all models of Commodore monitors when using an 8-pin 3-plug monitor cable.

** This applies to all models of Commodore monitors when using a 5-pin 2-plug monitor cable.



Figure 1



Figure 5

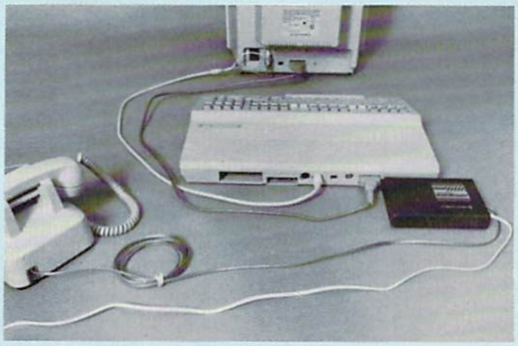


Figure 2



Figure 6



Figure 3



Figure 7

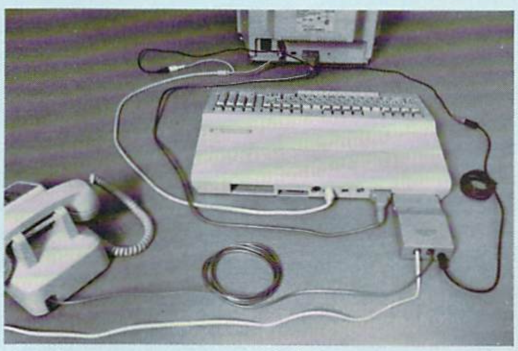


Figure 4



Figure 8





Figure 9

BY ROBERT W. BAKER

Inside QuantumLink

Explore the inner workings of the QuantumLink telecommunication service with network pro Bob Baker.

Time-Wasters

When viewing messages from a message board, remember that you can always stop them by hitting the F5 key at any time. As long as the check mark is displayed in the upper-right-hand corner of your screen, hitting the F5 key simply terminates the message at that point. The check mark should disappear, indicating the transmission has stopped.

Once the transmission has ceased, you can then press the F7 key to get the end-of-message prompt. This prompt lets you press F1 to see the next message in the thread or press F7 to see the options menu. Pressing F5 at either point will clear the current message and re-display the last screen of message headings that was displayed.

This shortcut really helps when you just want to read responses to a message you posted yourself, or when reading additional responses to a message you read previously. Press the F5 key as soon as the first heading line is displayed and the rest will be terminated. However, if the message is very short, you may wind up pressing the F5 key too late and the entire message will be cleared. In this case, you'll have to re-display the original message and then let the short message transmit to completion.

The new capabilities of scanning message boards for specified topics has been a real lifesaver. However, this feature makes it extremely important that everyone use meaningful headings for their messages when posting a new message on a message board. Try to use key words that relate to the subject of the message, using standard abbreviations if necessary.

Also, try to keep message headings short enough that the response indicator will not delete an important part of the heading when someone posts a response to your message. The (R) response indicator is always added in a specific column position in the heading, regardless



of what is already there. In some cases this can wipe out a very important piece of information.

I always try to include the machine-type in the headings I create when posting messages in the New Products Information section of CIN. This makes it easier to locate everything relating to the Amiga, for example, by scanning for every message containing the word Amiga. Fortunately, this won't be necessary for very much longer since we're going to start breaking the new product information into categories.

The New Product Information section has really taken off. More companies are starting to participate on a regular basis, with some even posting their own information directly to the message board. I've been posting as many as five to ten messages a day at times, and at one point the message board had over 1,000 messages.

Due to the volume of information in the New Product Information section, QuantumLink is going to start aging the message board to eliminate the older information after 60 to 90 days. We hope to save the older information in some kind of downloadable archive files so the information will still be available if needed.

Hot off the Wire

By the time you read this, we should have a new download area within the New Products Information area where demos, shareware, specifications, manuals, on-line catalogs, and software updates are available. Also, watch for special offers to QuantumLink subscribers that several companies have made available from time to time.

Additional download areas are also being added in a Special Edition Software Library within the Commodore Software Showcase section of CIN. This area is specifically for downloads of programs from major magazines. There will also be areas for downloads from specific authors.

You'll also find additional areas for specific companies. These areas are being created to give you direct access for assistance and feedback with the various companies producing major products. This should really be of interest as more companies participate.

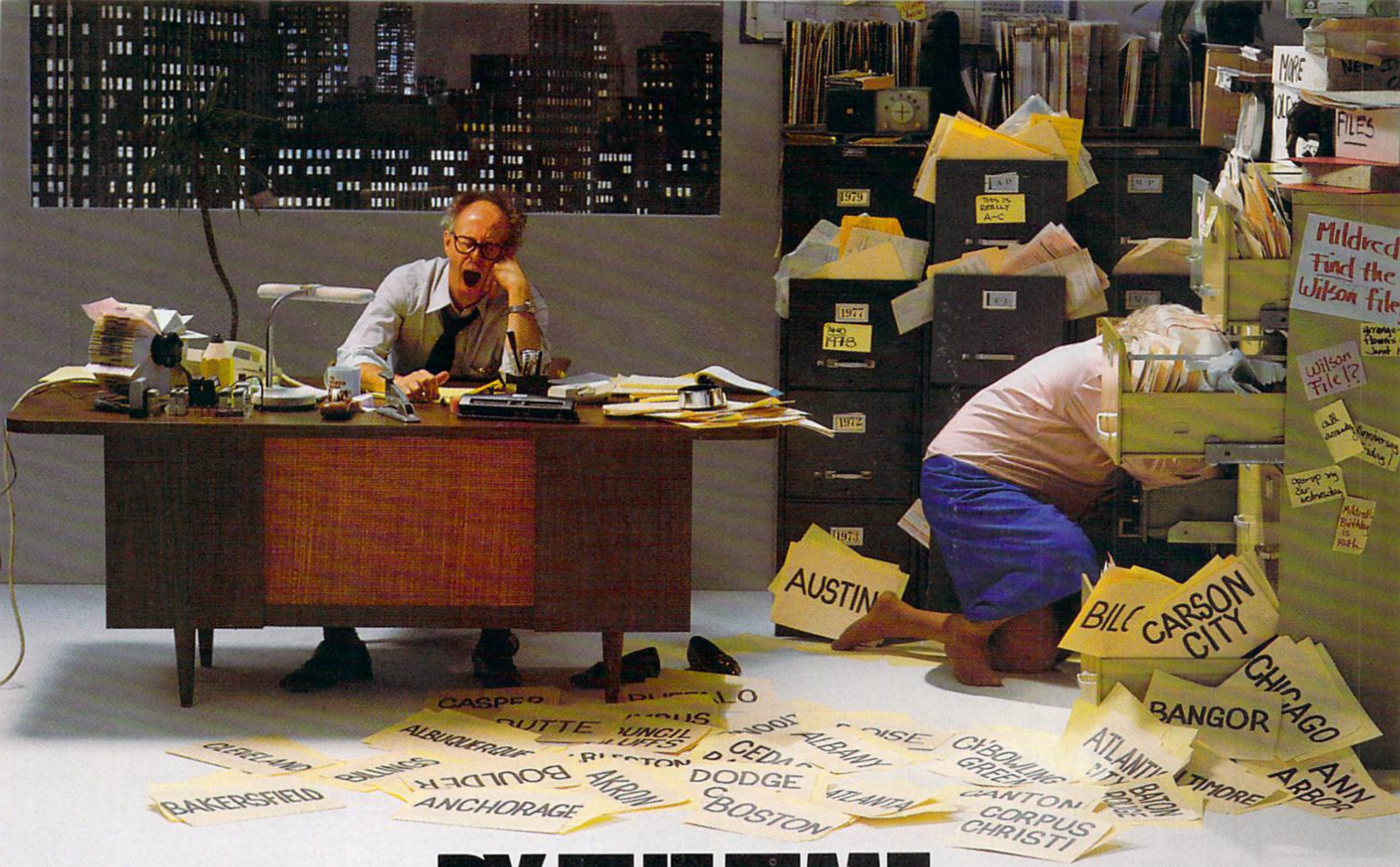
The Tutoring Center in the Learning Center is also expanding. You'll now find monthly schedules of classes, teacher profiles, and class descriptions from the main menu. When this column was written, courses included English, Mathematics, Science and Computer Programming.

Each of the Tutoring Center major topics has an individual class schedule, associated message board, downloadable study material, plus on-line quizzes within its own menu. Additional topics are also covered within a General Studies area, but these will only have simple message boards for now. Additional subjects are being added as teachers are arranged.

One last item of interest is the Treasure Hunt information available in Just for Fun. Users trying to solve the Treasure Hunt and win the $500,000 receive clues on-line. These clues, combined with the book and videotape, help solve the puzzle. The book is available for $9.95 and the video tape is available for $19.95. Both contain separate sets of clues leading to the treasure.

If you ever experience difficulty with the system, please bear with it. There is so much development work going on that small problems are bound to crop up from time to time. If you should run across a problem, notify the people at QuantumLink via E-mail to JENNY C so they can investigate and correct it. ■

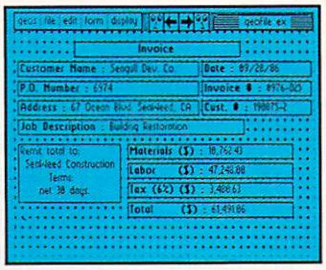
Bob Baker is in charge of the New Products Information area on the QuantumLink network. He can be reached on Q-Link via E-Mail addressed to RBAKER.



BY THE TIME SHE GETS TO "PHOENIX," HE'LL BE SLEEPING.

Having thousands of facts is one thing. Finding the ones you need is another. Which is why you should consider buying geoFile. The easy-to-use database manager for GEOS-equipped Commodores.

Whether they're receivables or recipes, once you have geoFile, you can fly through facts in seconds, clicking and picking the ones you want, just the way you want them.



It's as simple as filling out a form.

The geoFile "form" organizes all kinds of information. Like names, numbers, rates of objects' acceleration when dropped from two-story buildings—you name it. As much as you can fit on a printed page.

Once your data is in, the real fun begins.

You want names of bus drivers? From Arizona? Under five foot six? Between the ages of 33 and 35? With incomes of $22,396 or more? Who sneezed in June?

Just click your mouse and watch geoFile go to work. Searching. Sorting. Comparing and listing the data alphabetically. Or numerically. Or in whatever priority your form specifies.

You can put the data into form letters and lists with geoMerge. Or into math functions, with geoCalc. Or if you really want to get fancy, you can display your information graphically with geoChart.

And geoFile does it all in seconds.

Now, with all that in mind, what are you going to do—spend a few bucks on geoFile?

Or spend all night wishing that you had?

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geoFile $49.95

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$2.50 US/$5.50 Foreign for shipping and handling. Allow six weeks for delivery.

GEOFILE

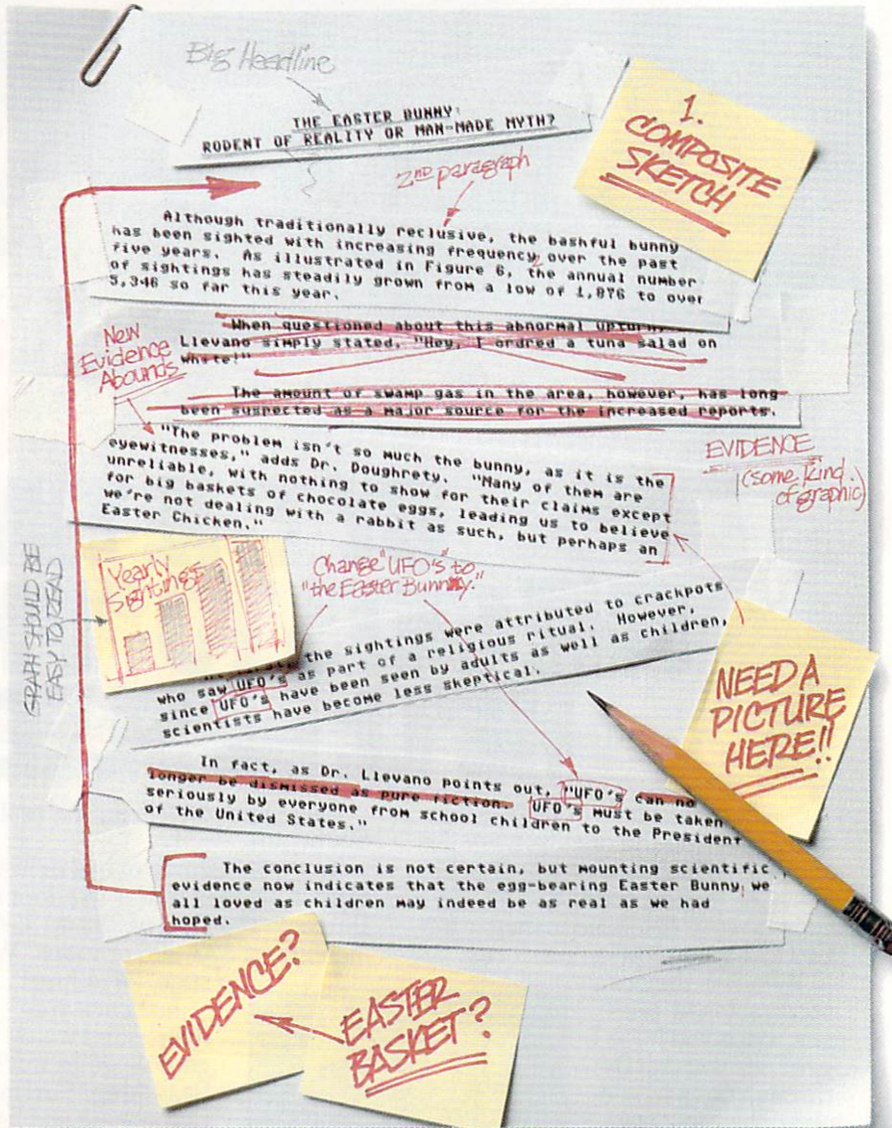
GEOS COMPATIBLE



Berkeley Softworks

The brightest minds are working at Berkeley.

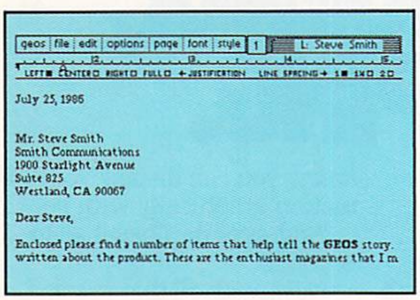
THE STRON
ARE BUILT WIT



Whether you're building an argument or just hammering out a memo, any project looks better when you put it together in Writer's Workshop. The supercharger that powers your GEOS-equipped Commodore through even the most wrenching assignments.

Sharpen your skills. The first thing to do in the Workshop is plug into geoWrite 2.0, which contains all the brand new tools you need to hone any rough concept into a well-crafted document.

You get headers. Footers. Subscripts and superscripts. You can center your text. Right justify. Full justify. And nail



down formatting problems with variable vertical spacing and adjustable margins.

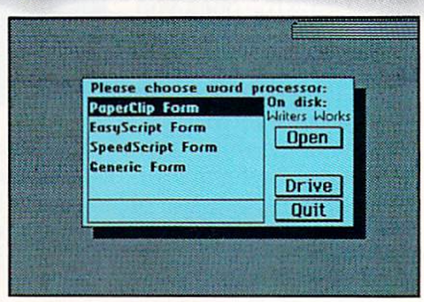
The Workshop cuts down on your manual labor, too. With one-stroke, "shortcut" keyboard commands. They keep your hands off the mouse so you can keep your mind on your work.

In fact, there's a complete set of heavy-duty accessories that not only strengthen your writing, but reinforce its structure, as well.

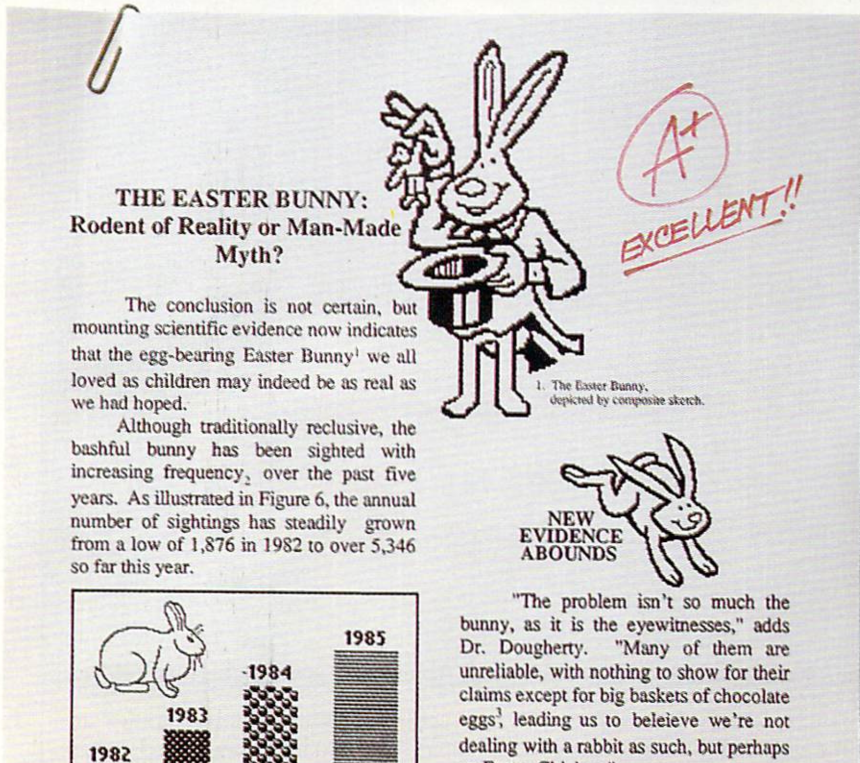
Replace old, worn-out parts. You can build anything with Writer's Workshop. And repair old stuff, too. Just decide which parts have to come out and which new ones go in.

Then hit the key and stand back.

Instantly, the "search and replace" drills through your old



GEST CASES
H A WORKSHOP.


THE EASTER BUNNY:
Rodent of Reality or Man-Made Myth?

The conclusion is not certain, but mounting scientific evidence now indicates that the egg-bearing Easter Bunny[1] we all loved as children may indeed be as real as we had hoped.

Although traditionally reclusive, the bashful bunny has been sighted with increasing frequency[2] over the past five years. As illustrated in Figure 6, the annual number of sightings has steadily grown from a low of 1,876 in 1982 to over 5,346 so far this year.

1982 1983 1984 1985

Figure 6: Increased sightings, 1982 to present.

1. The Easter Bunny, depicted by composite sketch.

NEW EVIDENCE ABOUNDS

"The problem isn't so much the bunny, as it is the eyewitnesses," adds Dr. Dougherty. "Many of them are unreliable, with nothing to show for their claims except for big baskets of chocolate eggs[3], leading us to beleieve we're not dealing with a rabbit as such, but perhaps an Easter Chicken."

At first, the sightings were attributed to crackpots who saw The Easter Bunny as part of a religious ritual. However, since The Easter Bunny has been seen by adults as well as children, scientists have become less skeptical.

In fact, as Dr. Llevano points out, "The Easter Bunny must be taken seriously by everyone from school children to the President of the United States."

Figure 4: Evidence submitted by Dr. Dougherty.

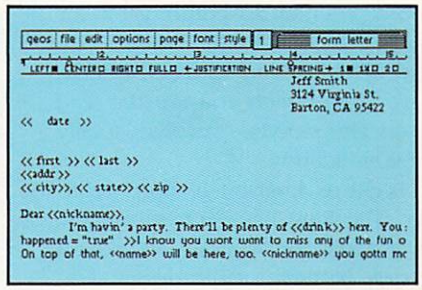
text, replacing worn-out words and phrases with your brand new ones.

For more serious cases, hand the job over to the Workshop's Text Grabber. It takes text from several word processors—like Paper Clip™—and lets you overhaul them with new GEOS fonts, formats and graphics.

A few more built-in features. Every project leaves the Workshop looking beautifully finished, too. Because it not only comes with LaserWriting compatibility, there's even a LaserWriter for you to print on.

You simply upload your files to QuantumLink.™ Then they're printed and mailed back.

Convenient, or what?



Of course, you don't want to keep good-looking documents like this to yourself. So we built in geoMerge. Which customizes your geoWrite form letters to people on your mailing lists.

So if your plans call for some real masterpieces, do something really constructive about it. Call your software dealer and requisition Writer's Workshop.

Who knows? You just might build a name for your self.

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(California residents add 6.5% sales tax.)
$2.50 US/$5.50 Foreign for shipping and handling. Allow six weeks for delivery.

WRITER'S WORKSHOP

GEOS COMPATIBLE



Berkeley Softworks

The brightest minds are working at Berkeley.

BY GRAHAM KINSEY

Defender of the Crown

Computer: Amiga
Publisher: Mindscape
3444 Dundee Road
Northbrook, O4IL 60062
Medium: Disk
Price: $50.00



Many Amiga owners will purchase this game for one name alone: Jim Sachs.

Mindscape's new adventure game for the Amiga is the first in Mindscape's Cinemaware series. It is an "interactive movie," a world in which you are the lead character. The storyline revolves totally around your actions.

The scene is England in the twelfth century. The king has been murdered, and as a result, the Norman and Saxon factions are battling for the throne. You play one of the three Saxon lords, and your goal is to capture all three Norman castles, which will make you king. You choose which Saxon you play. Each of the four choices has different levels of leadership, jousting ability and sword-wielding prowess.

The most valuable asset in this game is land. For each territory you own, you collect taxes—your main source of income. And you need all the gold you can get so you can buy men-at-arms, knights and catapults. But, of course, there are other alternatives. Challenge another lord to a joust with land as stakes. Or simply joust for fame. The jousting scene is the most life-like scene in the program. The sound of the opponent's gallop is extremely realistic.

But then, land-poor lords have quick reprisals. Sneak into another lord's castle at night and steal his gold out from under him. But be warned, you'll have to kill the lord's guards in hand-to-hand combat. Unless your character is Geoffrey Longsword (the only Saxon master swordsman), it will not be easy. And if you are captured in the process, you will have to ransom yourself out of there.

In the process, you'll have to learn how to build and lead an army effectively if you want to have any chance of becoming king. Having a good ratio of men-at-arms to knights in your army is very important. Just a few knights can tip an evenly matched battle between two armies into a rout. Without a backbone of men-at-arms to attack from, your expensive knights can get surrounded and destroyed in an instant.

Also, don't lay siege to a castle without a massive force, especially since a lot of practice is needed with the catapult before you can knock down a castle wall. And one final note. If you can rescue a kidnapped Saxon lady from the Normans, your luck in battle will improve tremendously.

The graphics in this program are amazing. You really must see it to believe it. In fact, many Amiga owners will buy this game because of one name: Jim Sachs. If you have seen any Amiga art before, you know that Jim Sachs has no equal. And believe me, in this game Jim maintains his reputation.

Unfortunately, I finished the game after only two days. I put in a total of about seven hours of play. At its current price, *Defender of the Crown* cost me about three times more per hour as any movie at the theater. If you are expecting an interactive adventure with graphics and sound like you've never heard before, this is a must buy. But if the premise of a fantasy-adventure has got you hoping for a better-looking *Ultima*, steer clear.

Be wary of the manual. For example, when it discusses the catapult, there are some discrepancies. The manual said that boulders were best for knocking down a castle's wall, but hurling Greek fire and diseased animals were best at killing the besieged soldiers. However, in the program you have no choice of what to catapult—you can only throw boulders.

Be careful when building a new castle in a newly won territory. Once a castle is built, 20 men-at-arms are automatically allocated to defend the castle. But you cannot allocate more than 20. So, in effect, building castles is of little value, because any decent-sized army can take your outer lands with ease.

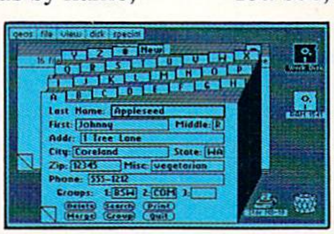
In summary, *Defender of the Crown* is very entertaining. Keeping in mind that it is not quite as complex as you might have expected, you can still relish the very impressive graphics. C

ARE YOU SEARCHING FOR FRIENDS?



If you're finding it increasingly difficult to find anything at all, maybe it's time you found out about geoDex. The GEOS-compatible directory that generates mailing lists. Prints address labels. And sorts out all sorts of things for your Commodore.

Try directory assistance. With a little help from geoDex, you can call up a directory organized from any three categories you choose. Which means you can list your friends by name, telephone number or almost anything else that can be assigned its own three-character code.



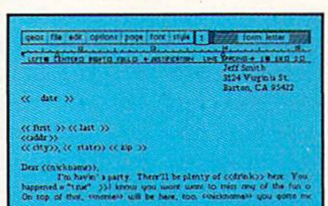
Like "MEN" for guys you know. Or "GRL" for girls you know. Or "FOX" for girls or guys you'd like to know.

But no matter how you choose to categorize them, if you can point and click a mouse, you can call up any list of friends with geoDex's easy-to-read graphics.

Our most inviting feature. Of course, once you've gotten your friends organized, the next thing we recommend you do with geoDex is really very simple.

Throw a party.

You see, geoDex comes with geoMerge, a mail merge program that customizes form letters, announcements—even party invitations—with the names and addresses stored in geoDex. First you write the letter with geoWrite. Then you select a list from geoDex.



Put them both together with geoMerge and it's toga time!

The search is over. So if you're tired of looking for friends, waltz right down to your software dealer and ask him for geoDex. We can't guarantee it'll win you more friends, but it'll certainly keep you from losing them.

To order call 1-800-443-0100 ext. 234

geoDex $39.95

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GEODEX GEOS COMPATIBLE



Berkeley Softworks

The brightest minds are working at Berkeley.

REVIEWED BY ERVIN BOBO

Chessmaster 2000

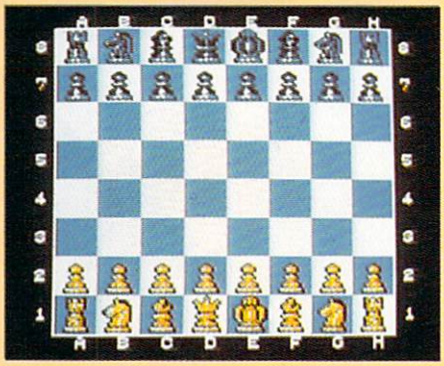
Computer: Commodore 64
Publisher: Electronic Arts
1820 Gateway Drive
San Mateo, CA 94404
Medium: Disk
Price: $34.95

There should be nothing new about a game of chess—every combination of moves has been made at one time or another. Computer chess, however, is another story. Programmers still have a ways to go in their attempts to simulate this game.

But with *Chessmaster 2000*, a new standard in chess for home computers may be set, not only because of the stunning 3-D graphics, but because it reaches new heights, boasting over 71,000 moves in the opening library.

Chessmaster 2000 *features over 71,000 moves in the opening library.*





In the standard play mode, you have an overhead view of the chess board with flattened chess men that look like decals. Press Control-P and the perspective changes. Now you are looking at the board from an angle much like the one you would have if you were playing with real pieces on a table. Each piece is drawn to give it a 3-D look.

In this mode, the board can be rotated 90 degrees at a time, allowing you to examine the situation from many angles. Using the rotation mode twice in succession will turn the board 180 degrees—useful for switching sides if you find the computer is beating you! You can switch sides any time during the game.

The board is blue and white, and the game pieces are blue and gold. For the benefit of those who may not have a color monitor, a black-and-white mode uses shades of gray.

For the novice and those of us who play so infrequently that we get muddled by moves like "king's pawn to rook 4," the classical notations of chess have been set aside in favor of an algebraic notation: D2-D4. You may also have the letters and numbers displayed around the borders of the board.

There is a large menu of choices, and you may toggle back and forth between the menu and the board to see how your choices affect the game. The menu divides your screen into four sections. At upper left is the main menu called Choices. Select any of the items listed here and a sub-menu appears at lower left. Select a feature and the box at lower right shows you the current status.

The box at the upper right of the screen displays all the moves that have been made. An asterisk in the notation—such as D2*D4—will indicate that an opponent's piece was captured with that move. On the other hand, if the notation carries a plus sign—as in D2-D4+—then the piece on D4 has placed the opponent's king in check. The information on moves can be sent to your printer so that you can have a permanent record.

In the Teaching mode, selecting the piece to move causes the square on which that piece resides to be highlighted, and the squares to which it may legally move are also highlighted. This will be a great help to the beginner and at the same time prevents illegal moves.

Also for the beginner is the Show Hint feature, which tips you off as to what your next move should be. It even plays fair! After almost throwing away a game because of a stupid move, I decided to rely entirely on this feature. You toggle between the menu and the game to see the suggestion. Thanks to these hints, I actually beat the computer.

The Show Thinking mode takes you to the inner workings of the computer, displaying each possible move. Search Level shows how deeply into possibilities the computer is considering. And for those who wonder just where things began to go wrong, the Replay Game option will show you.

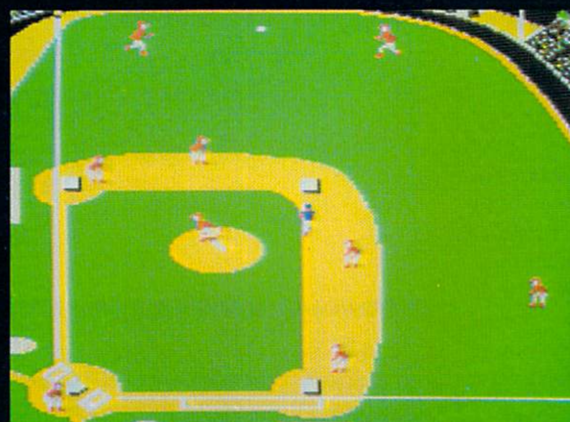
Playing against the computer, there are 19 levels of play ranging from newcomer to grand master. The level selected will determine not only the difficulty of the game but the time required to play it. In the higher levels, the computer spends more time searching for possible moves and considering the consequences of each move. At level 0 the computer makes one move every five seconds, and at level 18 it may take as long as 30 minutes per move. Fortunately, you may save a game and return to it later.

If you don't feel like playing a game yourself, insert the Games disk and watch a replay of one of 100 classic games. Here the play of past grand masters allows you to study and analyze their

Continued on pg. 114

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REVIEWED BY JEFF SEIKEN

Spitfire '40

Computer: Commodore 64
Publisher: Avalon Hill Microcomputer Games
4517 Harford Road
Baltimore, MD 21214
Medium: Disk
Price: $35

The one maneuver that requires the most trial-and-error effort to perform also happens to be the one most necessary to your survival—landing.



Try your hand piloting a Supermarine Spitfire, one of the most famous fighter planes to see action in World War II. The Spitfire earned its reputation for fighting the German Luftwaffe in the Battle of Britain, the three-month struggle in 1940 for control of the skies over England. In this battle, the Spitfire-flying pilots of the Royal Air Force, though heavily outnumbered, handed Germany her first defeat of the war and saved England from probable invasion.

Spitfire '40 has two modes of play—game or simulator. The game mode thrusts you into the middle of a swirling dogfight at 10,000 feet. The dogfight continues until you either run out of fuel or ammunition, or have been shot down three times. If one of these happen, the mission is over and the computer ranks your performance based on the number of enemy planes you destroyed.

A typical mission in game mode lasts about five to ten minutes, which makes this mode basically a fast-paced introduction. It gives you the chance to sharpen your shooting eye and acquire some experience in handling the plane under combat conditions before proceeding to the more demanding simulator mode. However, there is no feature to let you improve an existing score. When a mission is completed, even if you have not been shot down once, the computer permanently retires you. You can play again, but in this mode you start each time as a novice pilot with no kills to your credit.

For a sense of continuity between missions, as well as a higher level of challenge, simulator mode provides the answer. In this mode, combat is but one part of your flight routine. A scramble alert first appears on the screen, informing you of the number of incoming enemy planes, their height and their bearing. The mission officially begins with your take-off from the runway and does not end until you land your plane of the ground again or meet a fiery death somewhere along the way. At the conclusion of any successful mission, you can preserve your flight time and number of kills on a formatted disk, also known as your flight log, until your next mission.

You control your plane with the joystick and a handful of keyboard commands. Maneuvering the fighter is primarily a function of pushing the joystick to the left or right for turns and forward or backward to change altitude.

The game relies on two main screen displays. The first features a colorful and realistic rendition of the Spitfire's instrument panel, depicting about a dozen different dials and gauges. The second display shows the view from the cockpit window, but here the graphics lose the sharpness and detail seen on the previous screen. Objects on the ground, like buildings or ponds, appear as flat, odd-shaped blocks of white or blue. In combat, the German planes flit across the screen looking more like giant flies than sleek fighters.

The player's manual provides a helpful set of instructions on how to conduct some basic combat maneuvers like loops and rolls. These can be mastered with a little practice. In fact, most aerial acrobatics are instinctive in the heat of battle as you struggle to shake an enemy off your tail or keep one in your gunsights. With enough airspace, you can attempt practically any maneuver without wrecking your plane. In low altitude dogfights, however, keep a close eye on the altimeter. It's all too easy to lose track of height and send your aircraft on a screaming dive straight into the ground.

The one maneuver that requires the most trial-and-error effort before it can be performed with any degree of competency also happens to be the one most necessary to your survival—landing. Unlike almost any other situation you will face as a pilot, bringing your plane back down to the ground leaves no room for miscalculation. A little too much speed on touch-down or a slight tilt to the wheels leads to the same fatal results. Until you feel completely comfortable with the landing procedure, always take a long, long approach to the runway, one that gives you enough time to shed excess speed and make any last second course adjustments before your wheels bump the ground. Also, although the rules do not clue you in to this, it is possible to land in a field instead of on the airstrip.

Spitfire '40 has no clearly-defined difficulty levels. Rather, the more flight time you record on your log disk, the more realistic the simulator becomes. According to the rulebook, this means certain real-life quirks of the Spitfire design will make the plane harder to handle, and the German fighters will become tougher opponents. Otherwise, the rules are purposefully vague about when or in what ways these leaps in realism will occur. As a result, though my habit of missing the runway has not

Continued on pg. 114

America's Bestselling Naval Simulation!

Captain's Log . . . War Date 10.01.44



"Captain's Log, October 1, 1944. 0250 Hours. Fleet submarine USS Hammerhead proceeding Southwest at cruising speed. Our mission: intercept enemy convoy off the coast of Borneo. Disperse and destroy."

Tandy 1000/IBM PC Jr. screens shown



"0300 Hours. Two hours until dawn. Radar picks up convoy, escorted by two destroyers. We believe that one of the enemy's valuable cargo ships is part of convoy formation."



"0400 Hours. Lookouts on the bridge. Target identification party reports one cargo ship, 4,000 tons, troopship of 10,250 tons, with two *Kaibokan*-type escorts. Moving into attack position."



"0500 Hours. Sound General Quarters! Battle stations manned. Preparing for torpedo run. Gauge Panel OK. Periscope OK. Charts and Attack Plot Board OK. All mechanical systems OK."



"0525 Hours. Torpedo rooms report full tubes forward and aft. Battery at full charge for silent running. We hope water temperature will provide thermal barrier to confuse enemy sonar."



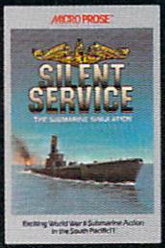
"0600 Hours. We are at final attack position. Convoy moving at 10 knots. Target distance decreasing rapidly . . . Crash Dive! Escorts have spotted us and are turning to attack! Rig to run silent."



"0700 Hours. Depth charged for one hour. Some minor damage, but repair parties at work. Destroyer propeller noises receding. We'll come to periscope depth for our return punch."



"0715 Hours. Torpedo tubes 1, 2, 3 fired. Two destroyers hit and sinking. One of the enemy's last cargo ships coming into 'scope view — an ideal target position. On my mark . . . Fire Tube 4! Fire 5!"



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REVIEWED BY ERVIN BOBO

Discovery

Computer: Amiga
Publisher: Micro-Illusions
P.O. Box 3475
Granada Hills, CA 91344
Medium: Disk
Price: $39.95





Your spaceship has crashed on a remote asteroid, and only you are in the condition to survey damage to the ship.

The first thing you do in *Discovery* is select which of the four crew members you wish to be: boy earthling (Scott), girl earthling (Katy), robot (Mek) or friendly alien (Lotar). You manipulate the character through joystick control. Up to this point, not that many games for the Amiga use a joystick. This may have lead you to believe that there is no Amiga joystick. And you're right. But there is no need for one because standard Commodore 64 joysticks work fine on the Amiga.

Following character selection, the game scenario and objectives are shown on-screen as the Amiga narrates them to you. The scenario is simple. Your spaceship, the Starship Discovery, has crashed on a remote asteroid, and only you are in the condition to survey damage to the ship. You do this by gathering the 12 fuel crystals that were scattered within the ship upon impact.

This sounds simple until you realize that your cargo of creepy and crawly alien specimens was released during the crash. They too are wandering around the ship. In addition, many connecting doors were sealed during the emergency that brought you down, and to open them now you must solve a math equation or spell a word.

The version used for this review is the math version, and upon booting you choose addition, subtraction, multiplication or division—or a mixture of the four. You also choose a grade level.

When you encounter a closed door, you'll notice a monitor screen on the wall near it. The screen on this monitor shows a line-drawing of a face, which changes expression as it invites you to solve the equation that appears just below the main screen. All messages from the animated monitor are done in the standard Amiga voice and are clearly understandable. A feature I especially liked was the problems that could only be solved by "carrying" numbers.

Solving the problem brings forth a congratulatory message, the door slides open, and you continue on your merry way, looking for fuel crystals and avoiding aliens. Should you fail to solve the problem, the correct answer will be displayed. But there is no free ride. Before you can proceed, you must solve an equation correctly.

Your spaceship, seen in cross-section, is actually a maze. Though you see only one or two compartments at a time, a smooth-scrolling action is automatic as you approach the border of the screen. At the bottom of the screen, an outline of the entire ship appears and your present location is indicated by a moving blip.

You move your character through corridors and up and down ladders in the exploration of the ship. Should you not wish to go down a ladder, you must jump over the opening by pressing the fire button. However, if your character jumps from a standing-still position, he may not make it. He won't be hurt, though, because falling is the proper way to descend. For a longer jump, you must develop a knack of continuing your walk and pressing the fire button as your character reaches the brink.

Only Scott, Katy, and Lotar actually jump; Mek, the robot, has rockets in his feet that help lift him over obstacles and act as retro-rockets to cushion his falls. Proper jumping technique and reflexes are important, because this is the only way to deal with the scuttling aliens. Should you jump on one instead of over one, you'll find yourself spun into a tizzy, costing you units of strength.

Score is kept on three levels: number of crystals recovered, units of strength (which increase as you find crystals and decrease as you contact the scuttling aliens), and a numeric overall score that is a result of finding crystals—50 points each—and correctly answering math equations—10 points each.

As a game, *Discovery* features extremely well-done graphic backgrounds, excellent animation (wait till you see your character climb a ladder), and good theme music—along with easy joystick control and a challenging puzzle.

Because the objectives of the game are presented on-screen at the start of each game, the written documentation is sparse and consists mainly of the proper way to enter your answers to the math problems. This is all the documentation needed.

As an educational tool, I found the math levels to match the grades for which they are intended (as near as I can remember; it's been a while since seventh grade). Moreover, the problems are written the way most likely to be found in schoolbooks and in test papers. And, of course, the system of rewarding a correct answer is tried and true.

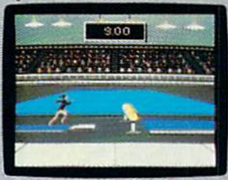
Although I've not yet seen it, the spelling version of *Discovery* contains word lists targeted at grades one through ten. There is also a trivia version available.

A great deal of work has been put into *Discovery* to make it enjoyable as well as playable. It is a delightful package that is worthwhile. Because the locations of crystals are random, each game is a new one and should keep the children coming back—exactly what you want from an educational game. I don't hesitate to recommend it highly. ■

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EPYX®

REVIEWED BY JOHN JERMAINE

Jet and Scenery Disks

Computer: Commodore 64
Publisher: Sublogic
713 Edgebrook Drive
Champaign, IL 61820
Medium: Disk
Price: $39.95 (Jet)
$19.95 each
(Scenery Disks)

I've always been fascinated with the science of flying, but let's face it: I'm no pilot. Randy Havener, a close friend of mine, has been flying planes for about nine years, but he's never written a software review. So we joined forces. Here we evaluate *Jet* and the Scenery Disks that work with *Jet* and *Flight Simulator II.*

Flight Simulator II has long been considered the ultimate flight simulator. So when Sublogic's programmers wrote *Jet,* they incorporated the basic features of *Flight Simulator II* with a simplified control and instrument system to make *Jet* easier to operate.

Jet has an interesting blend of common flight simulation features, with one or two new ones thrown in for good measure. The program possesses a practice mode and nine skill levels. This setup gives the aviator in your family the opportunity to make a flight as difficult as desired. *Jet,* like the *Flight Simulator II*, offers you six different views from the aircraft. To see the ground in *Jet,* however, the pilot must roll his plane upside-down and press the G key on the computer, then look up at the ground through the canopy. This strange way to view the ground isn't covered in the manual.

The control tower view was something I hadn't encountered before. By pressing the C key, the pilot can view how a person in the control tower would see the plane both in flight and on the ground, from its hanger out to the airfield. When the jet is in flight, the pilot can fly the plane as if it were remote-controlled, viewing the jet from the tower.

There is a zoom factor which is displayed at the bottom right-hand corner of the screen. A normal range of sight is all you need to fly conventional civilian aircraft flying at approximately 120 knots. In *Jet,* however, we're dealing with velocities approaching Mach 2, which is twice the speed of sound. To give the pilot a reasonable amount of reaction time to deal with objects he can't see in the distance, the creator of the program developed the zoom feature. When this is activated, the pilot has the ability to intensify or reduce the magnification of the image he sees through the aircraft's windshield. This feature operates like the zooming in and out of a camera lens, and it's saved my hide numerous times.


ED SAUK

The programmers of Jet *incorporated the basic features of* Flight Simulator II *with a simplified control and instrument system to make* Jet *easier to operate.*

Missions

Jet offers three different flight plans. First, you can fly your craft in free-flight mode. This phase offers three possible variations. One option allows you to fly around a fictional region created for *Jet* and stored on its disk. Or you can soar over actual American states, found in one of Sublogic's Scenery Disks. A final alternative is flying short distances in and around four major American cities (Seattle, Los Angeles, Boston/New York, and a region in central and northern Illinois) which are stored on the *Flight Simulator II* disk. Each location contains local landmarks as well as the major roads, airports and bodies of water already found on the Scenery Disks.

The other two flight scenarios challenge the experienced pilots of the group to drop bombs in the Target Strike mode or engage the enemy in a series of dogfights. During either mode of play, you have the option of flying a carrier-based F18 or an F16 stationed at a military airfield.

The dogfight has always been the classic test of a pilot's knowledge and skills. When you compete in this section of the program, you're required to maneuver into favorable positions for launching an attack against an armed moving foe. Should your assault turn into failure, a good pilot knows when to break off the attack and get away from the enemy. The enemy consists of MIG-21s and 23s, which rule the air with superior armament.

To counter these obstacles, *Jet* offers the player AIM-9 and AIM-7 missiles, and an M61 machine gun. It's important to remember the characteristics of each missile. The AIM-9 Side Winder is a lightweight accurate heat seeker, with a range of about five miles. The AIM-7 Sparrow is a heavier missile, using radar to home in on a target. It has a medium range of approximately 25 miles.

The game provides a standard armament of four missiles, but you can alter this. If you enter a dogfight carrying too much weight, you become a sitting duck because your fuel is consumed at an accelerated rate. As you alter the standard missile cargo, the scenario of your mission and the flight time also changes.

In the Target Strike mode of *Jet* the MIGs are gone, but you have to deal with surface-to-air missiles while mastering the art of precision bombing. Target Strike also have its own arsenal of armament for your plane. The AGM-65 Maverick missile has a small impact zone with a range of about 14 miles. An MK-82 Smart Bomb tracks a point on the ground as it drops and delivers a large payload of explosives. I encourage you to experiment with different combinations of armament weight to get fire power

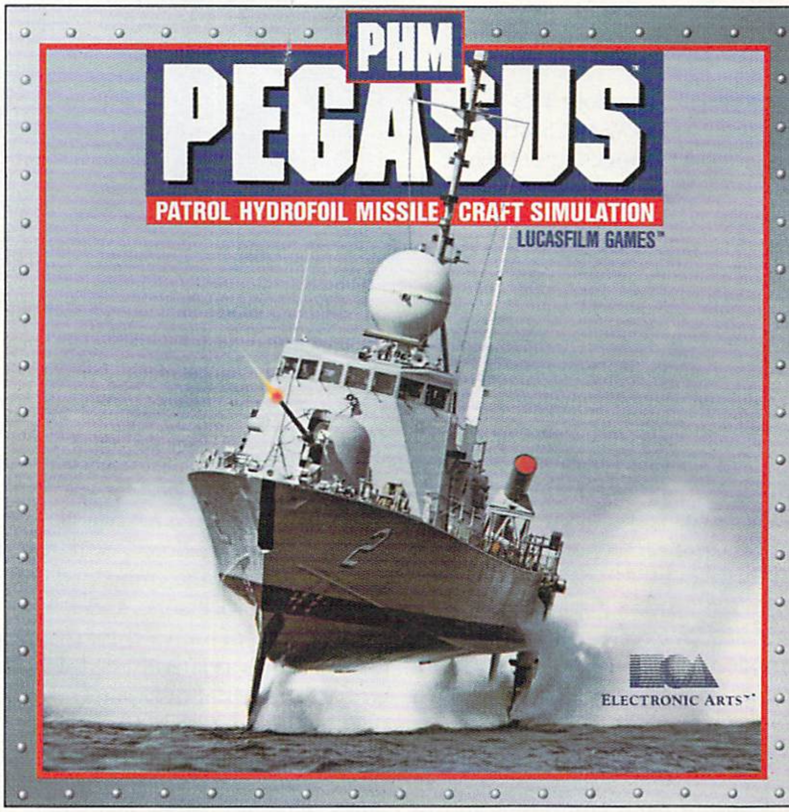
Continued on pg. 113

(Top Guns don't always fly on air . . . Some fly on water)

Warship of the Jet Age

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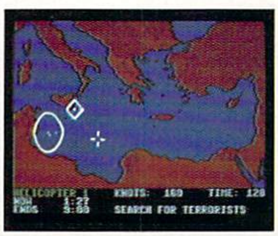
The Need for Speed . . .
Your search helicopter spots the Soviet-built Nanuchka II missile corvette charging across the "Line of Death." Foilborne and closing in at 50 knots, you've got him in your sights. Guns blazing, you lock-on and launch a Harpoon guided missile. Through the water spouts of his near misses, you see him explode into flames. Another mission accomplished.



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ELECTRONIC ARTS™

REVIEWED BY DONALD MAXWELL

The Big Blue Reader

Computer: Commodore 128
Publisher: S.O.G.W.A.P. Software
611 Boccaccio Avenue
Venice, CA 90291
Medium: Disk
Price: $29.95

"Big Blue" is a popular nickname for IBM, whose personal computer, the IBM-PC, has come very close to becoming an industry standard in business applications. Unfortunately, however, many fine computers—including Commodore's—use their own, very different standards, making the transfer of information between them and IBM's rather difficult.

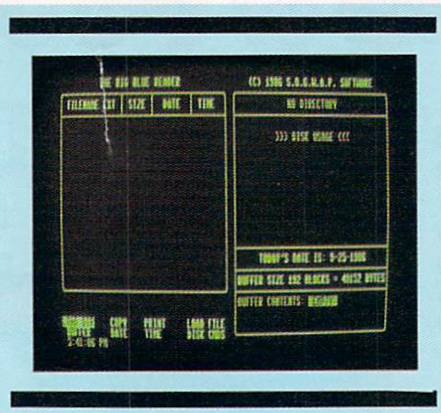
In the past, the only practical way to transfer data between an IBM-PC and a Commodore computer has been to wire the computers together using either two modems or the IBM-PC's RS-232 port and the Commodore's user port. Both connections require a terminal program be running in each computer, and to connect the RS-232 port and Commodore's user port, there must be a special interface to transform the Commodore user port voltages and polarities to RS-232 levels.

But now there's *The Big Blue Reader*, a utility program for the Commodore 128 that lets the 1571 disk drive read from and write to IBM-PC disks. It also makes back-up copies of entire IBM disks. And it formats disks so they work on PC's and PC-compatibles. (Ed.Note: The following discussion on transfering files refers to data files only. This program will not allow program from a 128 to be run on an IBM-PC.)

This is just the thing for folks like me who have Commodores at home but must use IBM-PC's at work. Now I can write something on a PC in my office, take it home and transfer it to a Commodore disk with *The Big Blue Reader*, revise it on my Commodore 128, and transfer it back again in the morning.

What The Big Blue Reader Can Do

IBM PC's use a disk operating system called MS-DOS. From now on I'll use MS-



DOS to indicate disks for IBM-PC and PC-compatible computers. With *The Big Blue Reader*, the 1571 drive can read and write MS-DOS versions 1.0 through 3.1. These include 8- or 9-sector single- or double-sided disks.

The Big Blue Reader handles all MS-DOS and Commodore ASCII text files and accounts for the embedded codes of most word processors. And it uses the "burst" speed of the 1571 for many operations, so it's relatively fast. In fact, it writes files to IBM disks somewhat faster than to Commodore disks. The only noticeably slow function is backing up entire IBM disks on a single drive, which requires four disk swaps for double-sided disks.

In addition to transferring word processor text files, *The Big Blue Reader* will also work with files for certain other productivity software such as spreadsheets, although this is useful only if the IBM and Commodore programs handle the information in their files similarly.

It will also copy BASIC programs, although again this is useful only with dialects of BASIC that both machines can understand. On the Commodore end, BASIC programs must also be converted to or from ASCII sequential files.

There are three programs on *The Big Blue Reader*: The Big Blue Reader itself, Big Blue Backup and Big Blue Format.

The Big Blue Reader Program

The Big Blue Reader program works in either 80-column or 40-column mode. It boots automatically when you turn on or re-set the computer. A title message appears for a few seconds, then the screen clears and you are asked to set the time and date that you wish to appear on MS-DOS disks.

Two menus—main and alternate—are displayed. On the 80-column screen the menus are side-by-side, and on the 40-column screen, one menu is visible at a time with the ALT key switching between them.

The main menu displays a disk directory. For Commodore disks, this contains the same information that you get when you call for the directory of a Commodore disk on the 128 or the 64, only reordered somewhat. For an MS-DOS disk, the information is similar to what you would see on the screen of an IBM-PC: the label of the disk (or if there is none, the information that it is an MS-DOS disk), the filename, the filename extension, the file size in bytes, and the date and time the file was saved on the disk.

Although it's not mentioned in the main menu, you can also print out the directory that is in memory. And you can read the directory of any other disk without affecting the directory that is already in memory.

The alternate menu is really a list of information about the disk. It shows the type of disk (Commodore or MS-DOS, the number of active sides on the disk, the number of sectors per track (if it's an MS-DOS disk), disk usage, the date of the disk, the buffer size in bytes, and the buffer contents (filename and file size).

Using this portion of the package couldn't be much easier. You make a selection from the main menu and The Big Blue Reader does it.

Copy Times

The Big Blue Reader actually writes MS-DOS files slightly faster than Commodore files. For example, here are copy times I recorded for a 10,000 byte file.

Load from Commodore disk	6 sec.
ASCII translation time	9 sec.
Write to MS-DOS disk	16 sec.
Load from MS-DOS disk	9 sec.
ASCII translation time	8 sec.
Write to Commodore disk	26 sec.

When The Big Blue Reader is reading an MS-DOS disk, the 1571 busy light flickers on and off, but the drive does not clack or make any other unusual noices. Commodore disks are read normally, with no flicker to the light.

Big Blue Format

Big Blue Format formats a disk so it will work with an IBM-PC or PC-compatible. The most popular double-density MS-DOS format is used: 360K, double-sided, 9-sectors per track. According to

S.O.G.W.A.P., the program first physically formats the disk, then logically sets up the disk for MS-DOS use. Formatting takes about one minute on the 1571.

Big Blue Backup

Big Blue Backup will copy an entire IBM disk, no matter if it is single-sided or double-sided, eight-sector or nine-sector. With two drives, this goes quickly and effortlessly. With only one drive, you have to swap disks twice for single-sided disks and four times for double-sided disks.

Documentation

The 23-page instruction manual is clear and concise. In fact, *The Big Blue Reader* is designed so that the manual is hardly ever needed.

The Big Blue Reader was written by Mike Miller, mainly in compiled BASIC. The disk also contains a brief program called INFO that displays copyright information, the S.O.G.W.A.P. address, and a telephone number for orders and information.

S.O.G.W.A.P., by the way, stands for Sons of God with All Power. This may suggest why the disk blocks not used by the programs are filled with the text of Paul's letter to the Ephesians—listed in *The Big Blue Reader* disk directory, mystically enough, as a copyright notice.

> The Big Blue Reader *overwrites the 1571 ROM with instructions that enable it to make sense of MS-DOS.*

What the Big Blue Reader *Cannot* Do

Although *The Big Blue Reader* will transfer nearly any type of file between Commodore and MS-DOS disks, it will not allow you to run IBM-PC programs on your Commodore 128 or vice versa. This is because the two computers use such different microprocessors that programs written for one will not run on the other, even though *The Big Blue Reader* can copy them. (The only exception is BASIC programs, noted above.)

Also, *The Big Blue Reader* cannot copy CP/M files—it won't even read a CP/M directory because CP/M is so different from MS-DOS, even though they both use IBM System-34 formatting (see the sidebar for more on this).

Evaluation

The Big Blue Reader does exactly what it's advertised to do, and it's easy to use. I can think of only two improvements for it. One would be the ability to erase files from MS-DOS disks and the other, to copy an entire Commodore disk onto an MS-DOS disk in one operation, and vice versa.

I hardly need mention how useful *The Big Blue Reader* is and how clearly it demonstrates the versatility of the 1571 disk drive. It's one of the most powerful utilities available for any computer.

DOS Primer

For practical purposes, all 5¼ inch floppy disks are the same—until they are formatted by a disk drive attached to a computer. Then things get complicated.

In the U.S. alone there are several very different formatting systems in common use. One, called CP/M, is used by Kaypro, Osborne, and several other brands. Another somewhat more recent system called MS-DOS is used by the IBM-PC and PC-compatibles. There are other systems, as well, including the Commodore GCR system.

Commodore, CP/M and MS-DOS disks are formatted so differently that most ordinary disk drives can read and write only one format and neither of the others. The Commodore 1571 drive, however, is so "intelligent" that it can read and write both native Commodore disks and CP/M disks. As it comes from the factory, however, it cannot make sense of MS-DOS disks. Here's a brief introduction to these three disks formatting and operating systems.

Commodore

Commodore drives employ a method of formatting disks called Group Code Recording—GCR for short. This method arranges the 35 tracks on each side of a disk into four groups. Tracks in the group near the outside of a disk, having a greater circumference, can store more data than can tracks closer to the center of the disk. Therefore, those outside tracks are assigned more sectors than inside tracks. On Commodore 64 and 128 disks, the outside group (tracks 1-17) has 21 sectors per track, the second group (tracks 18-24) has 19, the third (tracks 25-30) has 18, and the inside group (tracks 31-35) has 17.

But because the disk spins at a constant rate (about 300 rpm), the drive must vary the rate at which data is sent to each different group in order to keep the density of the recorded data nearly the same on all tracks. Commodore's GCR recording rate varies from 250,000 to 307,692 bits per second, with the fastest rate used for the outside group of tracks. The second side of a double-sided disk is formatted in the same manner as the first, except that the tracks are numbered from 36 to 70.

After a Commodore disk has been formatted, writing data to it begins at track 18 of the first side (side 0), proceeds alternately outward and inward one track at a time until that side is full. If it's a double-sided disk, the process continues on the other side (side 1). This allows the first side to be read by a 1541 disk drive.

CP/M and MS-DOS

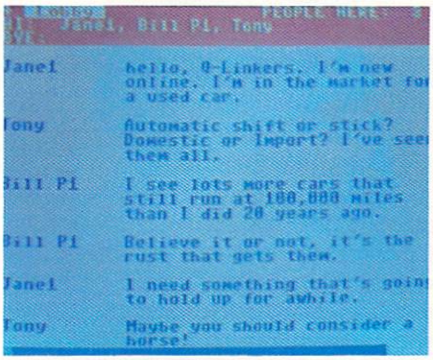
CP/M and MS-DOS both use a formatting system called IBM System-34. This refers to a method for constructing tracks on a disk. In this system, unlike Commodore's GCR system, the recording rate and the number of sectors per track are constant, but the data density varies, depending on the circumference of the track. Two different recording rates are common: single-density at 250,000 bits per second and double-density at 500,000 bits per second. Also, there are both single-sided and double-sided formats. There are 40 tracks per side and (commonly) either eight or nine sectors per track. Writing begins at track 1, side 0; and in double-sided disks switches to track 1, side 1; then to track 2, side 0; track 2, side 1; and so on.

There is also the matter of timing, or synchronization—the way a disk drive tells which sector is under the read-write head at any particular time. IBM System-34 uses the small index hole near the center of the disk to keep track of the orientation of the disk, thus allowing the drive to tell what part of the disk is being

Continued on pg. 114

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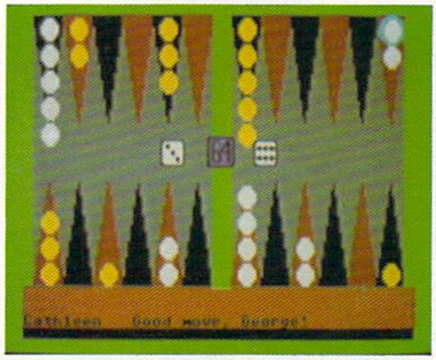
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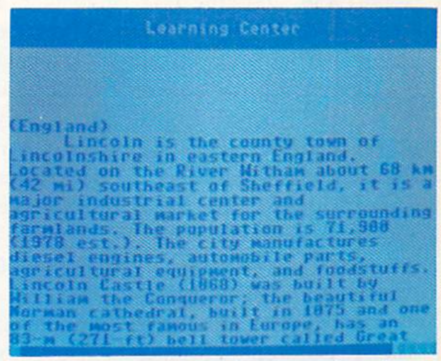
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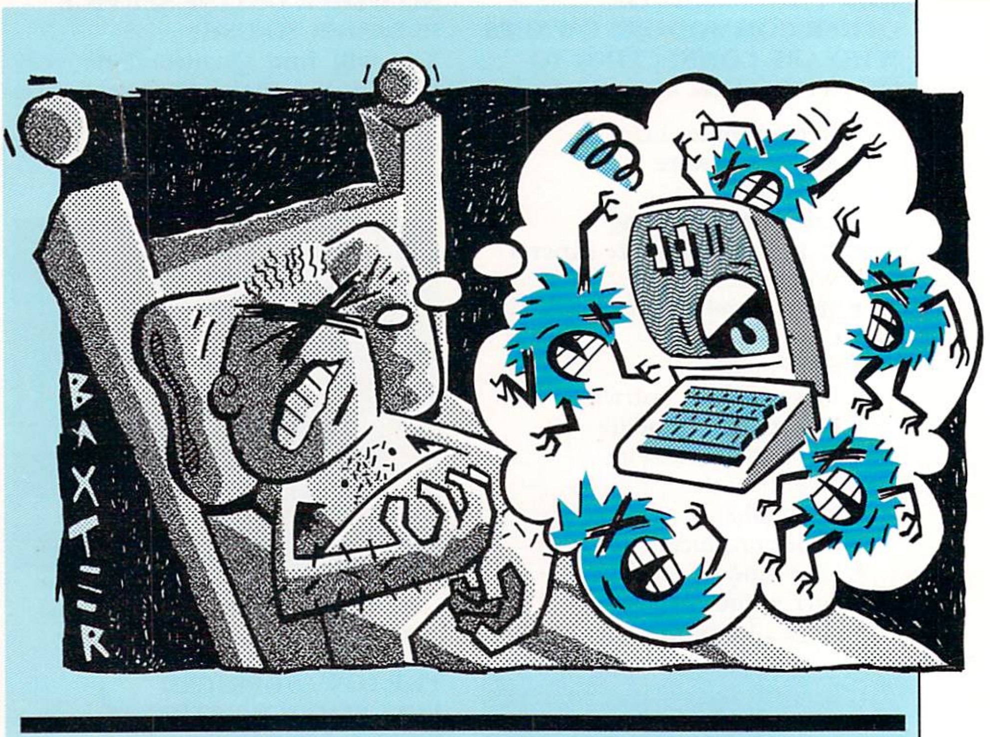
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REVIEWED BY GARY V. FIELDS

Gnome Kit

Computer: Commodore 64, Commodore 128
Publisher: Kira Corp.
P.O. Box 129
Kutztown, PA 19530
Medium: Disk
Price: 39.95



If you do any programming at all, *Gnome Kit* should put a spark in those sleepy screen-strained eyes. This disk-based utility kit is packed with help: a dozen BASIC programming aids; a machine-language assembler/disassembler; and a disk facility that gives you direct access to the disk drive's memory and each sector of a disk. All the tools are transparent to programs stored in the computer's memory (so they don't interfere with normal system operations) and are very easy to access. If you do a lot of programming, it can save you hours of programming and debugging time.

The single program disk contains a version of *Gnome Kit* for both the Commodore 64 and 128. So whether you are using BASIC 2.0 (the 64's language) or BASIC 7.0 (the 128's language), the same utilities are at your fingertips. At first I questioned the usefulness of these aids for the 128, since BASIC 7.0 already boasts a machine-language monitor, HELP key and functions like renumber, auto directory, direct disk commands and delete lines command. So I figured I would use the kit only when I was writing a program using my 64.

But I quickly discovered I was wrong. After mastering the utilities' simple command structures, it didn't take long to develop an addiction to *Gnome Kit*'s powerful commands which are in most cases more powerful than those built into the 128. Because all the commands are identical regardless of which computer is used (64 mode or 128 mode), it makes sense to use them all the time. The program also includes several impressive commands not included in BASIC 7.0.

The programs are unprotected, so you can backup the utilities on different disks for your own use. I placed the 64 version on the two disks I use while developing new programs using BASIC 2.0, and the 128 version on the disks I use when programming in 128 mode. This means I never have to search for the original program disk, juggle disks to get ready to begin, or worry about being without the utilities if a copy is damaged. Instead, I simply slip my work disk into the drive and begin.

But perhaps the most helpful feature is direct help from Kira. If you have a problem using the utilities or have a programming question, help is just a phone call away via their direct help line. I called the number twice during testing the programs for this review, and in both instances, Janet Brito returned my calls with answers or suggestions.

Each *Gnome Kit* version contains three separate programs: BASIC aid, a machine-language assembler, and disk facility. To simplify the review, I discuss the utilities when used on a Commodore 64 only. Everything is true for the 128 version as well unless specifically exempted.

When the program is first loaded, you load either the BASIC programming aids and the machine-language assembler or the disk facility. Both the BASIC aids and the machine-language assembler coexist in the computer's memory at the same time and can be accessed freely without dumping any portion of the system's memory. This means that you can develop both a BASIC program and a machine-language program at the same time. This arrangement makes it easy to develop and test BASIC programs that use machine-language subroutines without having to toggle memories or save and replace programs from disk.

The BASIC commands that *Gnome Kit* places at the programmer's beckoning include delete line ranges, display disk directory, enter disk command, load/append programs, quick save, merge, trace with either warmstart or coldstart, help, renumber program lines, auto line numbering, find (variables, text, commands), and dump variables.

If you are a 128 user, those commands may not overly impress you, since most are included in BASIC 7.0, but 64 users will probably water at the mouth at the thought of having such helpful aids directly accessible in BASIC 2.0. But as hard as it may be to believe (except for the trace command), all of *Gnome Kit*'s commands are more powerful and helpful than the 128's built-in commands.

For instance, when a BASIC 7.0 program runs into a problem, the 128 user can press the help key and the screen will display the errant line and highlight the general area of the problem. But the *Gnome Kit*'s help is also automatic. If an error occurs, the problem line will be instantly displayed with the cursor blinking on the error's location. So to correct and replace the line, all you need do is type the correction and press RETURN. BASIC 7.0 requires you first press the help key,

then list the errant line and correct it. Both are powerful aids, but I found *Gnome Kit* faster and easier.

My favorite command is "find." I've used a similar public domain program for years to help me locate programming problems, and was disappointed when a version was not included in BASIC 7.0. This command is especially helpful when you decide to finish a program you've let collect dust on a shelf for some time—and you can't remember which variables you've already used or want to locate a specific command or text string.

With the find command you can quickly locate the occurrence of a specific variable (A$, B%, NAME$), text or BASIC command. The command works similar to the search command which most word processors include. When issued, each line matching the find argument is displayed one after another. Or the lines can be dumped to the printer instead. In fact, output from all of *Gnome Kit*'s commands can be redirected to the printer, disk drive or any other connected device. This allows you to store data on disk. However, most users will prefer the printout option.

Even the renumber command goes beyond BASIC 7.0. You can renumber the entire program, selected blocks of lines, or restructure the program. This restructuring option lets the programmer logically arrange subroutines for either more clarity or increased speed. What this means is that a subroutine which is buried somewhere deep in a program can be renumbered and restructured to appear near the start of the program so it will be executed faster. When the subroutine block is moved to its new location, all the reference lines in the rest of the program are automatically redirected to the new location.

The trace command lets you inspect each program line as it is executed. *Gnome Kit*'s version of trace displays each program line (not just line numbers) as it is being executed. The command works similarly to the walk command of a machine-language monitor (you can slowly walk through the program by pressing the RETURN key).

Another plus is the ability to execute the trace either from a coldstart (reset all variables) or warmstart (preserve all variable values). In fact, the trace command includes an option to display each variable's changing value as it is encountered in the traced line. This display supplies the programmer important information needed to test a program's accuracy as well as detect difficult-to-catch programming bugs. Again, this information can be redirected to the printer if need be.

> *If you've been losing sleep tracing bugs, hunting for villainous variables, or reconstructing subroutines by hand, you need* Gnome Kit*—it's a programmer's salvation.*

The merge command lets you merge programs stored on disk with those in memory. This merge does not require that the lines of the disk program be higher than those of the one in memory as is true with most merge aids. In fact, the lines can mix regardless of their numbers, but if two duplicate line numbers exist in both programs, the disk-stored program line will replace the memory line number.

The merge command's power is expanded by *Gnome Kit*'s unique save command. The save command works on three unique levels: straight save (save all of the BASIC program); memory location save (save data in specific memory locations normally for graphics or machine-language programs); and block save. The block save, combined with merge, gives the programmer a powerful construction tool. The block save saves a specific block of lines (title screen, subroutine) to disk. Then using merge, you are able to quickly construct new programs using the same routines and line numbers. Any programmer will appreciate the time saved by this error-free transfer as well as the consistency it gives programs.

Gnome Kit's assembler/disassembler is similar to the 128's built-in machine monitor. Both are fine for assembling small machine-language programs or subroutines to be activated from BASIC, but neither contain the powerful control of a dedicated macro assembler like *Merlin* or *Pal*, which allow comment lines and labels. But on the other hand, because code is entered directly, there is no down time waiting for the assembler to translate instructions, or need to save source code to disk. The program gives you direct access to both the 64's and 128's memory. The biggest advantage of *Gnome Kit* over the 128's built-in monitor is that both 64 and 128 versions are identical, so if you are doing any machine-language programming on both systems, there is no need to learn the commands on two different monitors.

One curious feature of *Gnome Kit*'s monitor is that it defaults to the decimal number system instead of hexadecimal. The user can freely switch between the two systems, but beginning machine-language programmers must be careful to enter the system they intend to use, since 1300 decimal and 1300 hexadecimal are worlds apart. But many would-be programmers who have been baffled by the requirement of using the initially confusing hexadecimal system will be delighted with *Gnome Kit*'s option.

One of the machine-language monitor's nicest features is the ability to assemble text directly into memory. You can easily store data or messages in memory, where it can be recalled instantly by a machine-language loop. Other powerful aids include machine-language versions of trace, find, insert and delete blocks of memory, compare blocks (128 version only), and block copy as well as the standard assemble and disassemble options.

Perhaps the most curious thing about *Gnome Kit* is that the assembler is directly accessible from BASIC. This means you can simultaneously work on both a BASIC and machine-language program. In fact, you can have the monitor disassemble and alter your BASIC program while the program lines are still displayed on the screen.

The final feature of *Gnome Kit* is the disk memory facility. It must be loaded separately into the computer's memory and will have limited usefulness for most programmers. But for those ready to go one-on-one with the drive's microprocessor, who want to create their own personalized operating system, or who just need direct access to a specific location on a disk, this was written for them.

The two immediate low-level aids it

Continued on pg. 115

REVIEWED BY MARK COTONE

Buyer's Guide to Mastertronic

Computer: Commodore 64
Publisher: Mastertronic
7311B Grove Road
Frederick, MD 21701
Medium: Disk

Getting someone's attention is one thing, but holding it is another. Many bargain brand software companies have been able to attract initial crowds with their products' low prices, but it seems few have been able to flourish. Mastertronic is an exception. Affordability might be an effective lure, but in addition to this, Mastertronic provides colorful action-packed excitement. Here are highlights of some of the company's most recent programs.

Fans of our national pastime will be sure to enjoy *Slugger,* an arcade simulation that interlaces the familiar video baseball contest with some new wrinkles. Viewed from the cheap seats up high behind home plate, the field unfolds in 3-D splendor, complete with cheering fans, waving pennants and a detailed skyscraper background. In addition to multiple pitch selection, stealing, pick-offs and shifting outfielders, players can also choose uniform color, between-inning cheerleaders, three different swing speeds, and a giant center-field video screen.

The center-field video screen displays a field level side-view of the ongoing duel between pitcher and batter. This vantage lets the hitter more accurately judge the flight of the ball as it approaches the plate, helping him pick his swings. It's a clever touch that adds strategy.

All the action is controlled by a few joystick tugs, and the game can be played against friend or computer foe.

Representing a more contemporary sport is Mastertronic's *Five A Side Soccer*, a fast and furious computerized version of indoor soccer designed by Ken Grant. Some might remember Mr. Grant from his two Artworx hockey contests, *Slap Shot* and *International Hockey.*

The program offers two different ways for players to get their kicks. The first is a full-fledged, ten-minute soccer match, where two rival squads run, dribble, pass and check their way across a scrolling grass rink, improvising wave after wave of assaults on the opposition's goalkeeper. It also simulates the penalty shootout, a head-to-head duel between shooter and goalie that has long been soccer's most intense moment.

The match consists of five shots for each player, who alternate between offense and defense. Viewed from the kicker's vantage, this athletic guessing game will take a combination of reflexes, intuition and acrobatics to keep the ball from tugging the twine. And even if the tension tightens your vocal chords, the computer will be sure to lend the crisp cry of success: "He scores!"

If team sports aren't your ticket, perhaps you would prefer to take a gamble with *Las Vegas Video Poker* and *Jackpot*, an addictive disk containing accurate versions of both these casino coin gobblers. *Video Poker* tests your luck at classic five-card draw, reproducing the Vegas video machine right down to the coin slot. If you fancy yourself a card shark, this contest is sure to trim your fin. *Jackpot* brings home the notorious one-armed bandit, presenting a four-window slot machine complete with nudge and shuffle features. Both games make you realize how easy it is to loose a fortune.



ED SAUK

The plot has enough monsters, mazes, perils and puzzles to quicken the pulse of even the most seasoned adventurer.

In Mastertronic's *Master of Magic*, the stakes are a bit different. In this role-playing fantasy, you must traverse an unending series of underworld dangers in your search for the mystical Lost Amulet of Immortality. The plot has enough monsters, mazes, perils and puzzles to quicken the pulse of even the most seasoned adventurer.

But what really makes this program unique is the tiered game screen. The play field has been divided into three horizontal sections, each responsible for relaying different pieces of vital information. The top level serves two functions. On the right-hand side is an all-text rundown of the action as it transpires; a continuous updating of where you are, who or what you are with, and how it all affects your well-being.

The left half gives you a scrolling over-

head view of your surrogate as he searches his cavernous confines for clues to the treasure. He carries with him an everyday hand-held flashlight, using its limited beam to scour the surroundings. Whenever a creature, prize or obstacle crosses this path of light, it is then depicted in detailed first-person perspective on the game screen's bottom section. It is a startling transition, as a virtually indistinguishable blob you have viewed from above is suddenly given life. These added graphics give the game some much-appreciated visual substance.

Running across the center of the display is an options menu, where you use your joystick to choose what action you would like to take (run, look, pick up). The setup works well, creating and involving a constantly changing play field that's busy but never overwhelming. This is one of the first in a series of action adventures using this on-screen arrangement.

The arcade-style contest has always been Mastertronic's forte, and it is here that we make the final stop of our tour to look at *Speed King*, a new high-speed motorcycle racing contest. Snap your chin-strap, slip into your gloves and get ready for a ride. Following your bike at a low-level behind-the-vehicle perspective popularized by other racing contests, you must throttle through your gears, lean into the turns, and try to avoid those inevitable collisions to finish among 20.

Reaching speeds of 250 mph, the onrushing visuals will have you gripping your joystick for balance. A thorough options menu lets you modify any race to best suit your style. Ten world-famous circuits are represented and can be tested at three different skill levels with four different finishing lap requirements. It's an exhilarating test of reflex and strategy that will provide endless hours of two-wheeling excitement.

With the variety of challenges offered by Mastertronic, it would almost seem certain that this is one company that is sure to have something to satisfy everyone. But you don't have to go by my opinion, or anyone else's for that matter. With the price tag of $9.99 each, these games are a bargain. Just go and find out for yourself. What have you got to lose?

The Infinity Machine

Okay arcade aficionados, it's time for revenge. Give me the name of the one Commodore game that consistently gives you fits—that one particularly frustrating contest that always leaves you pulling hairs and gnawing joysticks. Fear not, for you shall no longer be a slave to that program. Assistance has arrived. It's called *Infinity Machine* for the Commodore 64, and chances are it will help you to not only beat your gaming nemesis, but to do so with regularity. And all without breaking a sweat.

> *By disabling the programming device called "sprite collision detector,"* Infinity Machine *makes your on-screen counterpart virtually invincible.*

This revolutionary new accessory is an ordinary looking cartridge that fits into the Commodore 64's game or expansion port. But what it does is simply amazing. By disabling the programming device called "sprite collision detection"—the part of the program that recognizes your character's fatal contact with a missile, obstacle or foe—it makes your on-screen counterpart virtually invincible. A sword to the head, a laser to the hull, and a vast majority of other attacks and pitfalls that in the past would have signaled death, are now rendered harmless, as if the player had been placed behind a protective shield. Victory becomes a matter of time.

"Dirty pool," you cry, "Games were never meant to be played like this!" And on that point, I agree. I would certainly not recommend that this device become a full-time partner in anyone's game plan. That would only take the challenge and enjoyment out of play. But this is more than just a cheater's treasure (and a reviewer's dream). *Infinity Machine* does have its legitimate uses.

For the youngster, this tool can open the door to a whole new library of software—programs that had originally been purchased for the adult members of the family. Even if a large chunk of the challenge is all but erased from play, it still allows the junior audience to participate.

For the players uninitiated to a specific game or game type, *Infinity Machine* is an ideal orientation aid, letting the newcomer get the feel of a difficult contest without constant play stoppages and restarts. And I'm sure even the seasoned pro must have at least a couple of thorns in his or her side.

By pressing a button, this device can be turned on and off during play. When the impossible impass presents itself, click on the protective shield, walk through undaunted and unscathed, and then proceed as usual. Immortality is at hand on your Commodore 64.

It should be noted that this cartridge will not work on any game that does not use "sprite collision detection." Experimentation is just about the only way to check if *Infinity Machine* will kick in on any particular program. My success rate has been around 50 percent.

I've overcome a heap of my old video stumbling blocks (including my main nemesis, Epyx's aptly-named *Impossible Mission*), and chances are this accessory will soon become your closest ally. And with its reasonable price ($24.99), revenge has never been sweeter.

Two-on-One Series

What could be better than picking up a Mastertronic program for under ten dollars? Why, picking up *two* Mastertronic programs for under ten dollars, of course!

Just when you're convinced that their $9.99 price break is the greatest entertainment package around, Mastertronic releases what they've tagged the Two-on-One software series, a group of single disk packages that contain not one, but two different arcade programs. The price? Get this—$5.99!

Mastertronic is marketing this series under the Gameware label. I recently had the chance to take a look at the line's initial three offerings, an impressive group with a heavy arcade slant. The selections have been paired according to gaming style, a gesture that tries to insure that a prospective buyer attracted to one contest will more than likely be interested in the other.

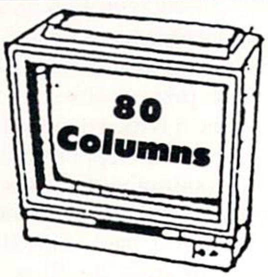
For fans of the jump-and-climb challenge, Gameware presents *Excaliba* and *Big Mac*, two solid and enjoyable reflex tests. In *Excaliba* you are cast as a fearless knight who must attempt to clear a multi-level screen of assorted relics, while avoiding the fatal touch of an evil wizard and his merciless minions. Quick thinking and quicker running will spell victory as you sprint up, down and around a variety of play fields. The occa-

Continued on pg. 115

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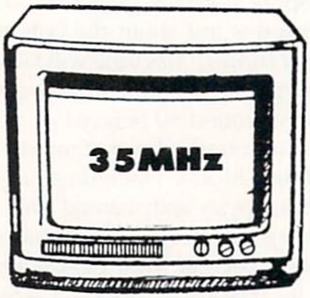
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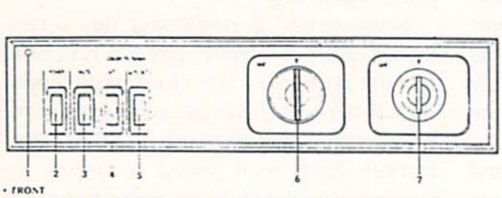
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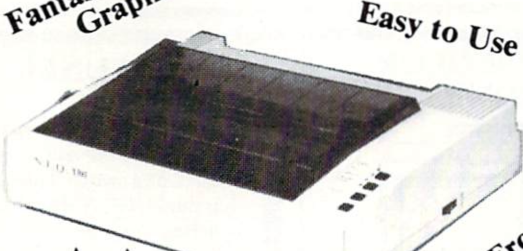
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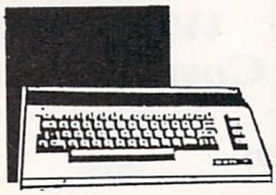
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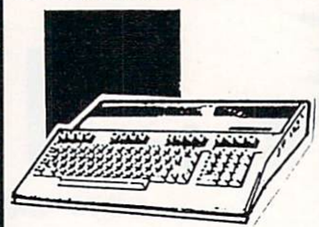
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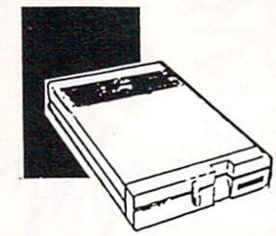
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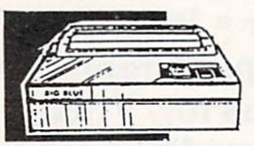
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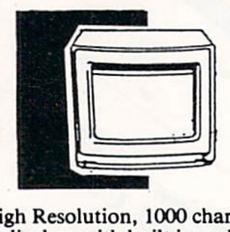
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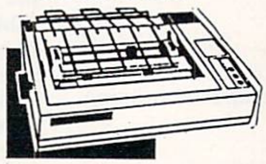
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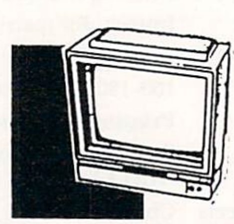


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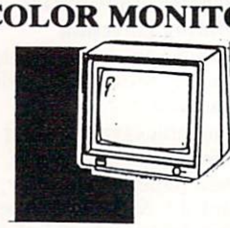


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Tips & Tricks

Hints for Fun and Utility

COMPILED BY LOUIS F. SANDER

Every month, we bring you a super collection of computer hints from readers all over the world. No matter what your area of interest or level of expertise, you'll find something to make your computer life more productive, more interesting or more exciting. To keep the column flowing, we solicit your short programs, useful programming techniques, computer room hints, and similar items of interest, and we pay up to $50 for the items we select. We look for new or recycled material that can be implemented with a minimum of time, effort and theoretical knowledge, and that is of current value to Commodore computerists of every kind. If you have an item that fits the bill, send it to:

Louis F. Sander
P.O. Box 101011
Pittsburgh, PA 15237

If you enclose a self-addressed stamped envelope, we'll send you our hint-writer's guide. Readers outside the U.S. may omit the stamp.

Learning about computing: One of the best ways to increase your computer knowledge is to go to meetings and conventions where there are other people with interests similar to yours. Most cities have at least one Commodore user group, and attending their meetings can put you in touch with some valuable computer friends.

Even more beneficial are the large Commodore conventions conducted by such groups as the West Coast Commodore Association. Manufacturers, publishers and software houses exhibit at these shows, and at their booths you can see their latest products and talk with people who are really in the know. Usually there are educational lectures as well, where you can learn about specific topics that interest you, and ask questions that only the experts can answer.

One of the best parts of these shows is the chance to meet the people whose work you've seen in print or on-line. At one show, I got to speak with Louis F. Sander, Jim Butterfield, Len Lindsay, Louis Wallace and several others whose articles and programs I've loved. I also met on-line personalities like QuantumLink's MISS CHRIS and BILL P1, and other notables like Commodore's Jim Gracely. All in all, attending that convention was one of the most exciting things I've ever done, and I recommend such shows highly to everyone.
Becky Cassell
Glendale, California

Label printer: The gummed labels with tractor-feed holes are useful for more than mailing lists. Printed as singles, they make ideal address labels for packages you send through the mail. Printed as multiples with your own address, they make great return address labels. Multiple identical labels also come in handy if you send numerous letters to the same person. I keep a large supply of pre-addressed labels on hand: some with my own return address, some with the address of this magazine, and some with my son's college address.

The accompanying short program is optimized for printing a single address repeatedly on 15/16″ x 3½″ labels, and is better for that purpose than any word processor. Because it uses upper- and lower-case letters, before typing it in, put your computer into upper/lower case mode by simultaneously pressing SHIFT and the Commodore key.

To use the program, put the desired address in the six DATA lines numbered 301-306. If your address is shorter than six lines, as most of them are, put spaces or null strings into the unused DATA lines. When you run the program, it shows you the label it intends to print, giving you a chance to correct any errors. Then it prints a dummy label (the numbers 1-6) to help you align your paper. Finally, it prints any number of labels you ask.

I keep several copies of the program on one disk, each with one of the addresses I use in my "stock" printed labels. Then when I need more labels, I load the appropriate program and make them. To make a one-of-a-kind label, I load one of the programs, change the DATA statements, then run the program.
Louis F. Sander
Pittsburgh, Pennsylvania

Continued on pg. 48



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Label Printer

```
100 PRINT"[CLEAR,RVS,SPACE4,SHFT L]
    ABEL [SHFT P]RINTER - [SHFT L]
    OUIS [SHFT F]. [SHFT S]ANDER
    [SPACE5]"
110 PRINT CHR$(14);"[DOWN,SHFT T]
    HIS PRINTS ANY NUMBER OF THESE
    LABELS:"
120 FOR J=1 TO 35:PRINT"[CMDR O]";
    :NEXT:PRINT
130 FOR J=1 TO 6:READ A$(J)
    :PRINT A$(J):NEXT
140 FOR J=1 TO 35:PRINT"[CMDR U]";
    :NEXT:PRINT
150 INPUT"[SHFT I]S THAT THE RIGHT
    LABEL (Y OR N)";A$:IF LEFT$(A$,
    1)="Y"THEN 180
160 PRINT"[DOWN,SHFT C]
    ORRECT THESE LINES, THEN [SHFT R,
    SHFT U,SHFT N] AGAIN."
170 LIST 301-:GOTO 260
180 PRINT"[DOWN,SHFT A]LIGN LABELS,
     TURN PRINTER ON, THEN"
190 PRINT"PRESS <RETURN> TO TEST
    ALIGNMENT..."
200 GET A$:IF A$<>CHR$(13)THEN 200
210 OPEN 4,4,7:FOR J=1 TO 6:PRINT#4,J
    :NEXT
220 INPUT"[DOWN,SHFT I]
    S PRINT ALIGNMENT [SHFT O,SHFT K]
     (Y OR N)";A$
230 IF LEFT$(A$,1)<>"Y"THEN PRINT"
    [DOWN,SHFT R]EALIGN LABELS, THEN
    [SHFT R,SHFT U,SHFT N] AGAIN.
    [DOWN]":GOTO 260
240 INPUT"[DOWN,SHFT H]
    OW MANY LABELS TO PRINT";N
250 FOR J=1 TO N:FOR K=1 TO 6
    :PRINT#4,A$(K):NEXT:NEXT
260 CLOSE 4:END
301 DATA" "
302 DATA"[SHFT L]OUIS [SHFT F].
    [SHFT S]ANDER"
303 DATA"[SHFT P]OST [SHFT O]FFICE
    [SHFT B]OX 101011"
304 DATA"[SHFT P]ITTSBURGH, [SHFT P,
    SHFT A,SPACE2]15237"
305 DATA"[SHFT U].[SHFT S].[SHFT A]."
306 DATA" "                        END
```

Easy printer stand: You can make a very useful printer stand from one of the desk trays sold at office supply houses and discount stores. Turn the tray upside down, with its opening toward the rear, and set your printer on top of it. Your paper will fit in the space between the disk and the top of the "printer stand" (really the bottom of the desk tray), and can be fed out of the opening and up the back of the printer.

These trays are available in a wide variety of colors, shapes and sizes, so you should be able to find one exactly right for your needs. The better brands come in letter, legal and data processing sizes; the data processing size is ideal for wide-carriage printers.
Robert L. Sander
Saddle Brook, New Jersey

Double-spaced listings: When printing program listings on your printer, it's often desirable to print them double-spaced. The extra white space makes it easier to follow the program and provides a place for notes and changes.

You can easily get these double-spaced listings by giving your printer file a number higher than 127. For example, OPEN 128,4 : CMD128 : LIST will produce a double-spaced listing on the printer. When the printing has stopped, reset the printer by executing PRINT#128 : CLOSE128.
Anna Mae Hertzler
Boynton Beach, Florida

Printer DIP switches: If you use a non-Commodore printer and interface with your system, both those units are likely to have several tiny switches that must be set properly for everything to work right. They're called DIP switches (after the integrated circuit Dual Inline Package standard that their size and contacts conform to), and you can set them with a pen point or other similar instrument. Because DIP switches are so important, some words of explanation are in order.

DIP switches configure your equipment for different types of operation by determining things such as number of characters per inch, number of spaces skipped between lines, and so on. The switch settings almost always have their effect when power is first applied to the printer or interface, so if you change them you must turn things off and back on before the changes take effect. And almost always, the DIP switches merely establish defaults; software commands can change the parameters they control. Such commands are usually given by sending special control characters or escape sequences to the printer.

Many printing irregularities are the fault of improper DIP switch settings. These settings are always covered in the instruction manual, but are seldom explained in detail. Usually there is a simple chart with very brief descriptions of each setting. To use your system effectively, you should have perfect understanding of these settings. If you can't understand them, show your manual to a friend who's knowledgable.

If both a printer and an interface are involved, you must coordinate the settings of the switches on both units. For example, both will frequently have DIP switches with identical functions, such as adding a linefeed after a carriage return. If you're not careful, you could get two linefeeds.

Similarly, you must coordinate your DIP switch settings with the default settings of the software you're using with the printer/interface combination. Getting three spaces between lines? Most likely the software, interface and printer are each adding one!
Kathleen Mead
Westerville, Ohio

QuantumLink file append: During a Q-Link on-line session, I often make several disk saves of incoming information. Instead of choosing a unique filename for each of these saves, I give the first one a very simple name, such as FILE. For subsequent saves on the same session, I use the filename FILE,A. The comma and the A cause the new information to be appended to the end of the previously created file, and I can append as many times as I want to.

When I later want to review the information I have saved, I only need to remember one filename—FILE. I can use my word processor to edit it or to break it down into different documents.

If you wanted to get fancy, you could use a more descrip-

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tive filename, perhaps including the date. FILE3/15/87 or QLFILE3/15/87, though more difficult to remember, are much more self-descriptive when seen in a directory.
Ranjan Bose
Winnipeg, Canada

Disk library tips: Most experienced computerists have developed certain systems and procedures for keeping track of their disks. Here are some of the better ones I've seen.

If you can avoid it, never give two disks the same ID, since some programs can become confused by duplicates. A good system is to assign ID's in a regular alphabetical sequence: AA, AB, AC, AD, and so on. Wherever you keep your disks, if you also keep a card that shows the ID's you've assigned to date, you'll easily be able to avoid duplicates.

Reserving certain disks for certain categories of programs often makes it easier to find what you're looking for. Common categories are utilities, sound and music, games, and word processing files.

Put your most-frequently-used program first on the disk, where it can be loaded by LOAD"*",8 or a similar command.

Don't try to use all the space on a disk, since you need space to update programs and data. Leaving 50-100 blocks free is wonderful insurance against overflow.

Keep one or two disks on hand exclusively for use in program development. As you work on new programs, save all your intermediate versions to one of these disks. Then when a program is finalized, put it on a different disk and erase all the previous versions. This saves wear and tear on your good disks, and lessens the chance that you'll ruin one of them.

Print out each disk's directory, and keep the hard copy close to the disk itself. Some people tape it to the disk envelope, while others keep it inside the envelope. Use this procedure to make the printed directory.

LOAD"$",8 <RETURN>
OPEN4,4 : CMD4 : LIST <RETURN>
Wait for the printer to finish, then type
PRINT#4 : CLOSE4 <RETURN>
Remember, the *only* legal abbreviation for PRINT# is P shift R.
Louis F. Sander
Pittsburgh, Pennsylvania

Screen marking hint: The special marking pens made for overhead projector transparencies are perfect for making temporary markings on your CRT screen. Their ink adheres nicely to the glass and is easily removed with a damp cloth. The Vis-a-Vis™ brand, make by Sanford, is available at any large office supply store in extra fine, fine and broad points.
Lucy S. Terrier
Alton, Illinois

TV interference: If you use a TV set rather than a monitor for your video display, you might have trouble with wavy lines on your screen. The key to eliminating them lies in the cable that connects the computer to the TV. It should be in good condition and totally shielded if possible. If your TV is set up for 300 ohm twin-lead, you should have a 75-300 ohm coupler between the terminals and your computer cable. It's often useful to coil the cable and tape it into place. It usually helps if you take the TV/computer switch box out of the circuit, or use some other method to remove the TV antenna connection whenever you're computing.

Radio Shack and similar stores have a wide array of connectors, cables, switches and filters for TV and video connections. The store manager should be willing to make some suggestions.
Harry Menhorn
Ross Township, Pennsylvania

Dead C128: If your C128 behaves as though it is dead, you've likely blown one of the two fuses in the power supply. If the computer doesn't do anything when you turn it on, the culprit may be the 4A 125V fuse inside the power supply. Be sure to unplug everything before disassembling the unit, and be careful what you touch—the internal capacitors can hold a pretty shocking charge! If you turn on the computer and the drive and printer initialize but nothing else works, replace the 1.6A 250V fuse which is easily accessible from the bottom of the power supply.
Al White
Lufkin, Texas
Note: Opening your power supply voids your warranty.

Division tutor: While there are many programs available to tutor children in simple arithmetic, many of them do not cover division. After trying to write such a program myself, I discovered why this is so—it's hard to find numbers whose quotient is an integer.

But the solution is simple. Since division is the inverse of multiplication, have the computer choose two random integers and multiply them together. Then for your division problem, divide that product by one of the two original numbers. The accompanying program illustrates this.
Richard L. Eberhardy
Green Bay, Wisconsin

Division Tutor

```
2 :
100 PRINT"[CLEAR,DOWN] DIVISION TUTOR
    - RICHARD L. EBERHARDY[DOWN]"
    :J=RND(-TI)
110 FOR J=1 TO 10
120 A%=10*RND(1)+1:B%=10*RND(1)+1
    :C%=A%*B%
130 PRINT"[DOWN]WHAT IS";C%;"/";B%;
    :INPUT D
140 IF D=A%THEN PRINT"CORRECT!":E=E+1
150 IF D<>A%THEN PRINT"WRONG! THE
    ANSWER IS";A%
160 NEXT
170 PRINT"[DOWN]YOU GOT";E;
    "OUT OF 10 RIGHT, OR";E*10;"[LEFT]
    %"
```
END

BASIC abbreviations: Your user manual lists short abbreviations for most of the BASIC keywords. Here's a summary of useful information about them.

The abbreviations are nothing more than a convenient way of entering statements from the keyboard. They *don't* save memory, even though they look like they should.

In addition to saving keystrokes, their greatest use is in squeezing extra keywords into a screen line. For example, the C64's screen editor limits line entries to 80 characters; if you abbreviate keywords, you can get more of them into the line. The principle works on other Commodore computers as well, whether the screen editor limit is 80 characters or

something different.

When you list a line that includes abbreviated keywords, the computer expands them to their fully spelled form. This can make the listed line longer than the screen editor's limit, but the line will still work perfectly. The thing you can't do is edit a line longer than the screen editor's limit; if changes to such a line are needed, you must enter it again from scratch.

You can avoid having to retype an abbreviated line, by making up a dummy line. Number the dummy so it will never be executed, and use a quotation mark as the first character after the line number. Then type your regular program statements, including abbreviations. Then list the dummy, which because of the leading quotation mark will include the abbreviations rather than their expansions, and will therefore not exceed the screen editor's limits. Change its line number to the one you want the actual line to have, delete the leading quotation mark, then press RETURN. List the line you've just entered, and observe that the abbreviations have been expanded. If you need to edit this line, list the dummy again, change the line number and delete the leading quote. Then edit the rest of the line and press RETURN to enter it.

It's easier to work with abbreviations if the computer is in upper/lower case mode, since the abbreviations then won't contain hard-to-read graphics. You can put your machine into this mode by simultaneously pressing the SHIFT and Commodore keys.

The proper abbreviation for PRINT# is P shift R. If you try to use ?#, the resulting line will *look* all right, but will give a syntax error when executed. Similar restrictions apply to GET# and INPUT#.

Jonathan Greer
Tyrane, Pennsylvania

Abbreviating zero: When a variable is assigned the value zero, such as in the statement N = 0, you can replace the zero character by a decimal point. The computer will interpret the decimal point as zero and will evaluate the expression significantly faster than if you had used the zero.

The trick works in direct mode as well, where it is especially useful in POKE statements. If you want to poke a zero into location 53281, for example, you can type POKE 53281,.—which is easier to type than POKE 53281,0.

You can use this trick wherever a zero is needed by itself, but not when the zero is part of another number, such as 200.

Robert Louis
Saddle Brook, New Jersey

Easy RUN: If you have a program in memory, you can run it very easily by simultaneously pressing the spacebar, SHIFT key and question mark key.

Another easy way is to type in any letter or letters (not numbers or other characters), then simultaneously press SHIFT and RUN/STOP.

Greg Heide
Great Falls, Montana

CONT for endless loops: The CONT statement is usually used in direct mode to resume program execution after a STOP or END statement. But it can also be used in a program to create an endless loop. Whenever your program executes a CONT, it will hang up until the STOP key is pressed.

Steve Macedo
Lutherville, Maryland

Continued on pg. 53

Tips & Tricks

Continued from pg. 51

FOR-NEXT hints: The FOR-NEXT loop is one of BASIC's most useful features. Here are some hints for using it more effectively on Commodore computers.

Remember that the loop variable is initialized before the loop's end is calculated. You can use this to your benefit, especially when the end value isn't obvious. For example, these two lines are handled identically:

```
100 FOR J = 49152 TO 49173 : READ K : POKE J,K : NEXT
110 FOR J = 49152 TO J + 21 : READ K : POKE J,K : NEXT
```

Line 110 is easier to type and to understand. Also, if you wanted to change the starting point of your pokes, line 100 would require you to recalculate the loop's start and finish, while with line 110 you'd only recalculate its start.

Your program should never exit a FOR-NEXT loop without first completing the loop. If you don't observe this precaution, you'll be plagued with mysterious out of memory errors. Here are some examples of the wrong and right ways to terminate a loop.

```
100 REM WRONG WAY TO QUIT
110 FOR J = 1 TO 10 : IF J = 5 THEN GOTO 140
120 PRINT J
130 NEXT J
140 PRINT "WRONG WAY TO QUIT!"
150 :
200 REM RIGHT WAY TO QUIT
210 FOR J = 1 TO 10 : IF J = 5 THEN J = 10 : GOTO 230
220 PRINT J
230 NEXT J
240 PRINT "RIGHT WAY TO QUIT!"
```

Notice that when line 140 is executed, J = 5 and the loop is still open. Note how line 210 closes the loop by setting the variable equal to the maximum loop value then executing a NEXT.

After the loop has finished, the value of the variable is equal to the first value after the loop's end. If the following is executed

```
100 FOR J = 1 TO 5 : NEXT
110 FOR K = 6 TO 3 STEP—1 : NEXT
120 PRINT J : PRINT K
```

the printed values for J and K will be 6 and 2, respectively.

Roger Wilcox
Durham, North Carolina

INT hints: Many BASIC statements and functions automatically perform an INT as an early step in their processing, and in those cases, an INT in your program may be unnecessary. Here are some that I've run across in my experiments.

Array Subscripts	MID$
CHR$	PEEK
DIM	POKE
GOSUB	RIGHT$
GOTO	SPC
LEFT$	TAB

Also, you can often eliminate the need for an INT by using an integer variable, as is shown by the following, in which A% is shown to have a value of 3.

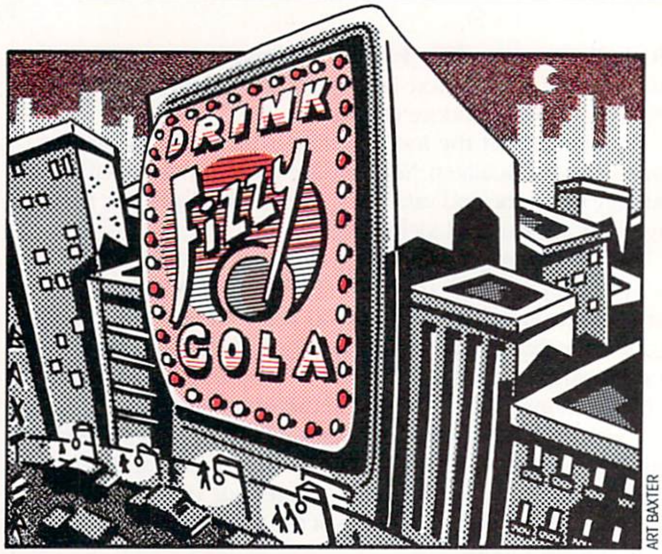
```
100 A% = 10/3
110 PRINT A%
```

A. W. Grym
Oxford, England

BY R. HAROLD DROID

Border Patrol

for the Commodore 64



ART BAXTER

Give your title and menu screens an illusion of movement.

No, this isn't a video game involving illegal aliens. The border being patrolled here is the perimeter of your computer screen. It creates the same illusion of movement you see in some electrical display signs. You fill the outer edge of the screen with a character, then change the colors at regular intervals to give the impression of movement. Once you've experimented with this a little, you can remove the INPUT prompts, substitute fixed values, and incorporate this into any BASIC program. It's an easy way to add visual interest to a title or menu display.

Here are descriptions of the prompts and how the values entered affect the display.

SPEED controls how fast the border "moves." More specifically, the number you enter here is the number of sixtieths of a second between "moves." So the prompt, though perfectly descriptive, is a little misleading—lower "speeds" actually make the border move faster. Acceptable values are in the range of 1-255.

SCREEN CODE specifies which character will be used to form the border. Note that these are *screen* codes, not ASCII codes. Some of the more useful ones are code 81, a filled-in circle; 160, a reversed space; 102, a checkerboard pattern; or 83, the heart.

The remaining prompts let you create a sequence of colors. This pattern is repeated around the perimeter of the screen.

NUMBER OF COLORS is the number of elements in this series. You can use the same color more than once. The maximum value here is 127.

COLOR CODE lets you enter the colors in sequence. Use the same code you would use in a POKE statement to change the color of the screen.

Once installed, this program requires no further attention, and the border will move while a BASIC program continues to execute. The BASIC program can control the border with pokes and peeks; the specific addresses are in the program listing.

You can stop the motion with SYS 49155 and start it again with SYS 49152. So if you're tired of title and menu screens that just sit there, you can make your programs move, even while they're standing still! ■

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

Border Patrol

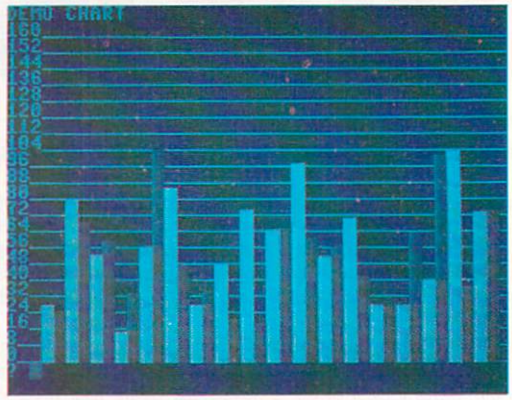
```
20 SUM=Ø:FOR I=49152 TO 49371:READ J
   :POKE I,J:SUM=SUM+J:NEXT'JGTL
30 IF SUM<>31532 THEN PRINT"ERROR IN
   DATA":END'GJWI
40 INPUT"SPEED";N:POKE 49377,N'CKUE
50 INPUT"SCREEN CODE";N
   :POKE 49378,N'CKIH
60 INPUT"NUMBER OF COLORS";N
   :POKE 49379,N'CKFJ
70 FOR I=1 TO N:PRINT"COLOR CODE
   NUMBER"I;:INPUT X:POKE 49379+I,X
   :NEXT'ISKQ
80 SYS 49152'BFMF
90 PRINT CHR$(147):END:REM CONTINUE
   ANY BASIC PROGRAM FROM HERE'ENNR
100 DATA 76,6,192,76,36,192,120,
    173'BBYA
110 DATA 2Ø,3,141,22Ø,192,173,21,
    3'BAQB
120 DATA 141,221,192,169,51,141,2Ø,
    3'BCYC
130 DATA 169,192,141,21,3,169,1,
    141'BBID
140 DATA 222,192,88,96,12Ø,173,22Ø,
    192'BEMF
150 DATA 141,2Ø,3,173,221,192,141,
    21'BCQF
160 DATA 3,88,96,2Ø6,222,192,2Ø8,
    88'BBGG
170 DATA 173,225,192,141,222,192,16Ø
    38'BFFI
180 DATA 173,226,192,153,Ø,4,32,
    188'BBNI
190 DATA 192,173,224,192,153,Ø,216,
    136'BEEK
200 DATA 16,238,169,39,141,153,192,
    141'BEOC
210 DATA 162,192,169,4,141,154,192,
    169'BESD
220 DATA 216,141,163,192,32,147,192,
    169'BFNE
230 DATA 4Ø,141,153,192,141,162,192,
```

Continued on pg. 64

BY ROLF L. MILLER

Standard Screen Vertical Bar Charting

for the Commodore 64



Bar charts are used to graphically display statistics. Although bit-mapped plotting offers the best resolution, speedwise it is more suitable for machine-language programming. Fortunately, the built-in graphics available on the Commodore 64 make standard screen bar charting relatively easy.

Horizontal displays have the advantage of nearly twice as many spaces in which to plot a bar's value. However, that is not acceptable in some applications. A stock price chart, for example, requires vertical bars. There are two general types of vertical bar charts. In one, the bars always have a bottom value of zero (Figure 1). In the other, the bars have both a bottom and top value (Figure 2).

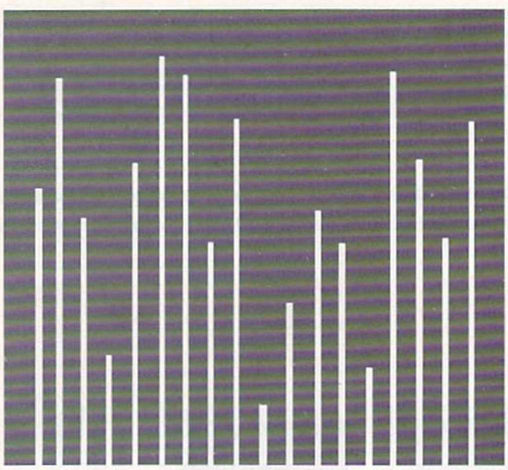


Figure 1

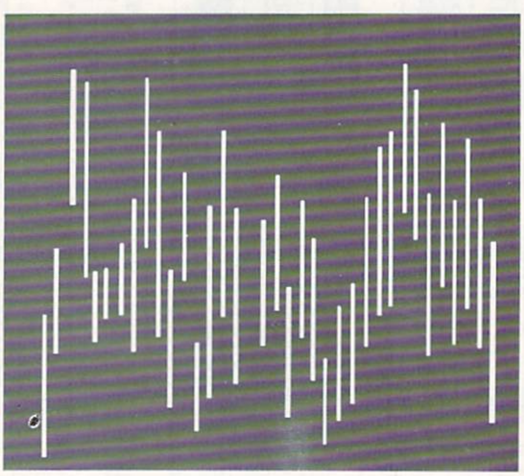


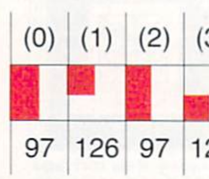
Figure 2

Use fractional graphics for better resolution.

Figure 2 has twice as many bars as Figure 1 because the character form selected occupies only half a screen column. Thus, each column can be utilized while still providing a separation between the bars. However, it allows only half-space vertical resolution whereas the full-column characters in Figure 1 allow eighth-space resolution. Of course, each column in Figure 1 could be utilized by producing the bars with distinguishing colors.

Examining the demonstration program, a three-item menu selects the chart type. Then the bottom and top values for each bar are randomly generated and stored in D% array. In real applications, of course, an input routine would be used. During this process, the highest top value found is placed in D%(0). This value is later used to calculate the chart's scale.

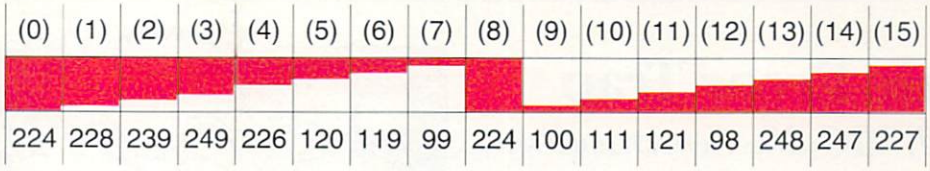
A% array is then filled with the screen codes of the characters to be used. Screen codes are used because the plotting will be accomplished by poking screen memory. The array is first filled with four codes of the half-column characters as shown. (The element reference is in parentheses.)



If a full-column chart has been selected instead, the array is refilled with 16 codes, as follows. It is noted that the codes higher than 127 are the reverse of those to which 128 has been added.

As the characters show, a vértical space can be resolved by two or eight, depending on the form selected. R is set accordingly. Note that element (1) or (1) through (7) correspondingly represents the appropriate bottom character of their reference. Likewise, (3) or (9) through (15) hold the tops and (0) and (2) or (8) hold the full-space character. Thus, referencing the array in poking the screen will produce these characters.

In order for the bars to have meaning, the display must be scaled. For the demonstration, the first and last three screen



lines are reserved for text. That leaves 21 lines for charting, one of which will be the zero line. Thus, HV = R*20 sets HV to the highest value that can be plotted without exceeding the top of the chart.

But, obviously, a bar's value may exceed that. If so, the value each chart line represents will have to increase, and the bars' plotted values equally reduced to keep the perspective correct. Thus, S% = 1 + D%(0)/HV sets S% to one plus the number of times the highest top value exceeds the highest value that can be plotted. Then IV = S% *R sets the increment value of each chart line. The bar values are correspondingly factored by S% during plotting.

Now the screen is cleared and top text line printed. Following that, the value each line represents is calculated and printed with a grid line. (Note the semi-colon following PRINT P$.)

Then, the plotting ensues. In effect, the bar is drawn by plotting the bottom and top and filling in the space between. After all, it is the bottom and top which mark the important points on the chart. E = B% — (INT(B%/R)*R) calculates the beginning value of the factored bottom value, leaving E set to the appropriate array element for the bottom character. After it is plotted, R is added to B% and spaces plotted up till B% is no longer less than the factored top value (T%). Then, B% is set to T% and the top character determined as was the bottom, except that R is added to E to access the top characters in the array.

The zero line appears on the fourth screen line up from the bottom and, to preserve the displayed line values, plotting will be calculated from the third column. A look at the screen memory map in the *User's Guide* reveals the corresponding screen address to be 1866. From this, adding 1 will move the plot one column right and subtracting 40 will move the plot up one line. X% keeps track of the column being plotted. It starts at 1 and is incremented by I, which is 1 or 2 depending upon the chart selected. Y% = B%/R calculates the line to plot. Thus, the screen address is SA = 1866 — (Y% *40) + X%.

Color memory is poked with DC + CC. Both variables are 0 and result in black bars unless dual color is selected. Then DC is 3, which is cyan, and CC is varied between 0 and 1 to

Continued on pg. 99

BY KENNETH DENNISTON

Dynamic Error Trap

for the PET, VIC 20, Commodore 64 and 128

There is no error trapping capability in the BASIC used in the Commodore PET, VIC 20 and 64. If the computer encounters an error in your BASIC program, an error message is printed on the screen and the program stops. An error trapping routine not only allows the program to continue running, but also gives you control over what happens when an error occurs.

Now you may be thinking, "Wow! What a powerful capability. It's too bad I can't do that on my Commodore." But now you can have your own BASIC error trapping routine!

You may know that it is possible to trick Commodore computers into thinking that you have typed something on the keyboard by a technique which is sometimes called the dynamic keyboard. The secret of this technique is the ten-character keyboard buffer. When a program is running, characters typed on the keyboard are stored in this buffer until the program ends or they are pulled out by an INPUT or GET statement. However, you can make the computer think that characters were typed on the keyboard if you poke them into the buffer. This technique has been used to load programs and make self-modifying programs.

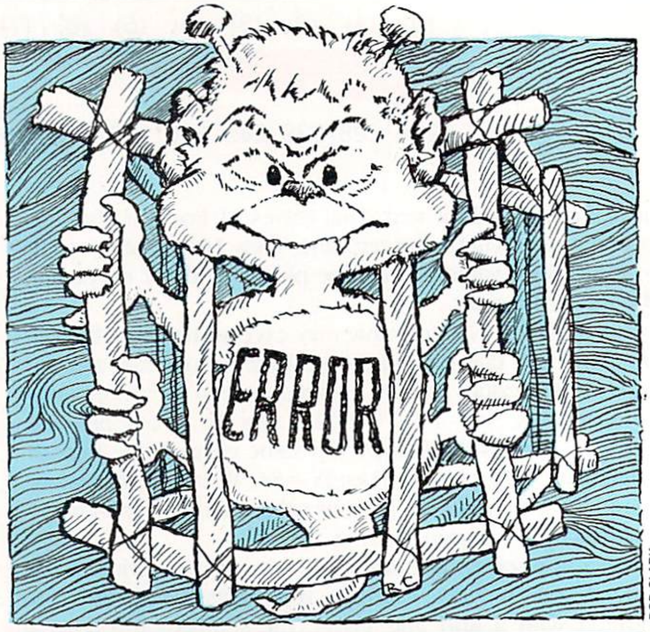
We can use this same technique to trap any errors and allow the program to continue running. Listing 1 is a short sample program with the error trapping routines for the VIC 20 and Commodore 64. Listing 2 can be used on the PET.

Here is how it works. The routine at line 800 sets up the error trap. This is done by poking GOTO900: and a RETURN into the keyboard buffer. The POKE 198,9 tells the 64 that there are nine characters in the keyboard buffer. You must have a GOSUB 800 at the beginning of your program to enable the trap.

Once the trap is enabled, if the program is stopped by an error the computer will think you typed GOTO900: and pressed RETURN, causing it to go to line 900. The colon after the number prevents another syntax error if the GOTO900: is printed on the screen on a line with other text. At line 900 you can put whatever you want your program to do when an error occurs. In this case we simply print ERROR TRAPPED! and go back to line 100.

Since the characters in the keyboard buffer are pulled out by the INPUT statement, we must be careful how we handle INPUT. There is a sample INPUT routine beginning at line 700. You will notice the POKE 198,0 in line 700. This clears the keyboard buffer by telling the computer there are zero characters in it. (You must also clear the buffer before ending the program, as in line 140. Otherwise the computer would GOTO 900 instead of exiting the program.)

After the input statement, we execute a GOSUB 800 to reset the trap. It is a good idea to INPUT a string variable and then convert it to a number with the VAL function if you want a number. If you use a numeric variable in the INPUT statement, it is possible to get an overflow error while your



BOB CLARK

Build an error trapping capability into your BASIC program.

trap routine is disabled for the input.

If your program uses the GET statement, you will have to take similar measures to those used for INPUT. The trap must be disabled so that the GET will not get the trap characters that are in the buffer. After the GET, enable the trap with a GOSUB 800.

You might think that a problem could arise from errors in subroutines, since the trap routine executes a GOTO which leaves the subroutine without a RETURN statement. However, this is not a problem, because the operating system resets the pointers for subroutines when the error is encountered. Yet variables are not cleared, so the variables defined in the program will not be disturbed. It is possible that the nature of the error has disturbed your variables, but most errors should leave them intact.

To use the error trap in your programs, just include the routines at 800 and 900, and put the GOSUB 900 and POKE 198,0 in the appropriate places.

If you have a Commodore 128, forget everything you have just read. The 128 has an error trap built into BASIC! Just include this line at the beginning of your program.

```
10 TRAP 900
```

This will transfer execution to line 900 if an error is encountered. At line 900 you can handle errors in the same way as in Listing 1, except you should replace the GOTO with RESUME 100. The program will RESUME at line 100. The command RESUME NEXT will resume execution at the next statement after the statement containing the error.

This way of trapping errors is much more elegant, and certainly more powerful, but those of us with vintage Commodores can still trap BASIC errors with Dynamic Error Trap. This routine will add a professional touch to your BASIC pro-

grams and solve some of the problems that arise when an undiscovered bug crops up. It is especially useful if you are writing large programs which will be used by other people.

One final word of warning. This method trapping will not work with BASIC compilers like *BLITZ.* This is because the compiler will not be able to compile the GOTO900: that you poke into the keyboard buffer. **C**

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

Listing 1

```
100 GOSUB 800'BDLV
110 PRINT"TRAP TESTER"'BAIY
120 PRINT"INPUT A NUMBER (0 TO QUIT)";
    'BBME
130 GOSUB 700'BDKY
140 IF N=0 THEN POKE 198,0:END'FIBD
150 THIS LINE GENERATES AN ERR
    OR!!!'BALH
699 REM  *** INPUT ROUTINE ***'BSOX
700 POKE 198,0'BFXC
710 INPUT X$:GOSUB 800'CGUE
720 N=VAL(X$):RETURN'DGOG
799 REM  *** TRAP SETUP ***'BPHX
800 FOR X=1 TO 8'DDBE
810 POKE 630+X,ASC(MID$("GOTO900
    :",X,1))'ENHK
820 NEXT'BAEE
830 POKE 639,13:POKE 198,9:RETURN'DNEJ
899 REM  *** TRAP ***'BKSW
900 PRINT"ERROR TRAPPED!"
    :GOTO 100'CELI
```

DO NOT USE MAGAZINE ENTRY PROGRAM WITH THIS LISTING

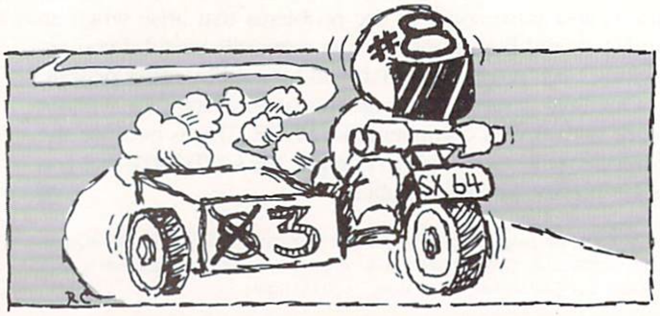
Listing 2

```
100 GOSUB 800
110 PRINT"TRAP TESTER"
120 PRINT"INPUT A NUMBER (0 TO QUIT)";
130 GOSUB 700
140 IF N=0 THEN POKE 158,0:END
150 THIS LINE GENERATES AN ERR OR!!!
699 REM  *** INPUT ROUTINE ***
700 POKE 158,0
710 INPUT X$:GOSUB 800
720 N=VAL(X$):RETURN
799 REM  *** TRAP SETUP ***
800 FOR X=1 TO 8
810 POKE 622+X,ASC(MID$("GOTO900
    :",X,1))
820 NEXT
830 POKE 631,13:POKE 158,9:RETURN
899 REM  *** TRAP ***
900 PRINT"ERROR TRAPPED!":GOTO 100
```

END

BY TIM BROWN

SX-64 Renumber Utility



Renumber an external drive attached to the SX-64 and still have the internal drive remain drive #8. Or renumber both drives to any combination you choose.

This utility program enables the SX-64 to renumber an external drive attached to the SX-64 and still have the internal drive remain drive #8. This procedure cannot usually be done. Normally you have to renumber the internal drive and leave the external drive #8, which can get confusing.

This utility program also renumbers both drives to any combination you choose, as long as the two numbers are not the same. The trick is to renumber the internal drive with a number you do not intend to use at all, temporarily, then renumber the external drive as desired (8-13). You are now free to renumber the internal drive with any number you wish except #14 and the number you used on the external drive.

This program was designed for the SX-64 to overcome renumbering handicaps due to the fact that one drive is built-in. It may be used on any two-drive system, however. No changes will need to be made. You may wish to change the title and prompts, though.

After typing in the program, just run it. All you have to do is follow the prompts. Make sure you save it before running it in case you make a mistake.

Here's a description of the program lines.

1070: SP$ are spaces to clear the printed messages.
1110: Screen colors. Can be changed to your choice.
1120: CHR$(14) selects lower-case.
1130: Reminds you to use only numbers 8-13 for drive number choice.
1140: Clears keyboard buffer of any leftover key presses.
1150: First half of the flash prompt.
1160: Time delay for the flashing prompt. To flash faster, lower the limit, i.e., for i = 1 to 10 would be very fast.
1180: Waits for you to press RETURN.
1190: Second half of the flash prompt.
1200: Erases the prompt.
1210: Inputs the internal drive number you are going to use.
1220: Checks to make sure you use numbers between 8-13.
1230: Initializes the drive (totally harmless).
1240: Temporarily renumbers the internal drive to #14.
1250: First half of the second flash prompt.
1300: Inputs the external drive number you are going to use.
1310: Checks to make sure you have used numbers 8-13.
1320: Checks to make sure both drives do not use the same number.
1330: Renumbers the external drive to the number you have chosen.
1350: Renumbers the internal drive from 14 to the number you have chosen.
1360: Initializes the drive after you have renumbered it.
1370: Advises you that the program is completed. ■

Before typing these programs, read "How to Enter Programs," and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

SX-64 Renumber

```
1070 SP$="[SPACE39]"'BDNG
1080 TF$="[HOME,DOWN5,YELLOW,SHFT T]
     URN OFF[RVOFF,WHITE]"'BDRG
1090 TN$="[HOME,DOWN9,GREEN,SHFT T]
     URN ON [RVOFF,WHITE]"'BDIH
1100 EX$=" EXTERNAL DRIVE"'BDGY
1110 POKE 53281,0:POKE 53280,0'CPLY
1120 PRINT CHR$(14)"[CLEAR,DOWN2,
     SHFT S,SHFT X]-64 [SHFT I]
     NTERNAL AND [SHFT E]XTERNAL
     [SHFT D]RIVE":PRINT"[SHFT R]
     ENUMBER.";'DGRO
1130 PRINT" [SHFT U]SE #'S 8-13
     ONLY"'BAJC
1140 POKE 198,0'BFXY
1150 PRINT"[RVS]"TF$EX$'BGQB
1160 FOR I=1 TO 150:NEXT
     :REM TIME DELAY'FQKH
1170 PRINT"[DOWN,SPACE6,SHFT P]RESS
     [RVS,SHFT R,SHFT E,SHFT T,SHFT U,
     SHFT R,SHFT N,RVOFF]"'BANK
1180 GET A$:IF A$=CHR$(13)THEN
     1200'FNYH
1190 PRINT"[RVOFF]"TF$EX$
     :FOR I=1 TO 150:NEXT
     :GOTO 1150'GSSL
1200 PRINT"[HOME,DOWN5]"SP$'BDYV
1210 INPUT"[HOME,DOWN7,SHFT E]NTER
     [RVS,RED,SHFT I]NTERNAL[RVOFF,
     WHITE] [SHFT D]RIVE # ";IN'BDYG
1220 IF IN>13 OR IN<8 THEN 1210'FLLC
1230 OPEN 1,8,15,"I"'BHJA
1240 PRINT#1,"M-W"CHR$(119)CHR$(0)
     CHR$(2)CHR$(14+32)CHR$(14+64)
     'IARK
```

Continued on pg. 102

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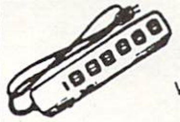
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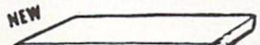


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BY TIM JONES

AmigaBASIC Tutorial

Part 2: Menus

A short program demonstrates difficult areas of AmigaBASIC, offering both tips on confusing areas and tricks to make your life easier. Rather than an article followed by a program, we have combined them for the sake of clarity.

```
    ' This file assumes that you understand how screens and windows
    ' are called from AmigaBASIC. If you don't understand those
    ' points, please review part 1 entitled Screens before
    ' proceeding.

DefineScreenWindow:

  Title$ = "MENU Tutorial                              TIM JONES"

  WINDOW 2,Title$,,7,-1
  WINDOW OUTPUT 2      ' These calls were covered in part 1 if
       ' you need help. We are using the
       ' default Workbench screen (saves
       ' memory!).

InitMenus:     ' We define our menus here

    ' Menu statements take on the following format:

    ' MENU Menu#, Item#, ActiveLevel#, "String"

    ' Where Menu# is the number of the menu (Returned in MENU(0)
    ' when it is called). Item# is the menu item that was selected
    ' (Returned in MENU(1) when the menu button is released).
    ' ActiveLevel# (0-2) determines if the menu or particular item
    ' is selectable. If it is 1, it is selectable. 2 indicates
    ' that it is selectable and has a checkmark to the left of the
    ' string. If it is a 0, the string is ghosted and is not
    ' selectable. If the menu designator is 0, the entire menu is
    ' not selectable. Also, only ActiveLevel's of 0 or 1 are
    ' allowed as the menu designator 0 ActiveLevel.

    ' ActiveLevel is referred to as AL in the future.
 MENU 1,0,1,"First Menu"    ' The first menu is active
   MENU 1,1,1,"  First Item"
   MENU 1,2,1,"  Second Item"
   MENU 1,3,1,"  Third Item"
   MENU 1,4,0,"  Can't Select it!"
 MENU 2,0,0,"Second Menu"    ' The second menu is inactive and
                             ' ghosted.
   MENU 2,1,1,"  First Item"   ' Even if the item is other than
                               ' AL 1, the MAIN AL of the menu is
                               ' 0.
   MENU 2,2,2,"  Second Item"   ' Even the checkmark is ghosted!
   MENU 2,3,0,"  Third Item"
 MENU 3,0,1,"Quit Menu"    ' This menu gives you the way out.
   MENU 3,1,1,"  Exit to BASIC"
 MENU 4,0,0,""

    ' Note: If you don't include the menu 4 statement, the BASIC
    ' 'Windows' menu stays active.

InfoText:
  CLS: COLOR 3,0
  LOCATE 8,1 : PRINT " Press and hold the right mouse button."
  PRINT "This will activate the menu strip at the top of the"
  PRINT "screen. Move the pointer onto the strip to select an"
  PRINT "item (just like Workbench). You will notice that menu"
  PRINT "2 is totally ghosted. This means that it is not"
  PRINT "selectable. If you try to select a menu 2 item, nothing"
  PRINT "will happen. Also, as you select items from menu 1,"
  PRINT "the appropriate MenuItem will have a checkmark placed"
  PRINT "immediately to its left side."
MainLine:
  ON MENU GOSUB MenuSelection : MENU ON
  SLEEP
GOTO MainLine

    ' All that is accomplished by the above routine is to activate the
    ' menus with the MENU ON command and then wait for the user to
    ' press the menu button on the mouse (the right button). The SLEEP
    ' function just tells the program to do nothing unless it is caught
    ' by the user pressing the menu button on the mouse. This makes
    ' your program more compatible in a multi-tasking situation by
    ' allowing the Amiga to take care of other tasks until the
    ' awakening function occurs (in this case, the menu button is
    ' pressed).

MenuSelection:

   MenuSel% = MENU(0)      ' Which menu did the user select (1-4)?
   MenuItem% = MENU (1)      ' Which item in that menu?
   ON MenuSel% GOSUB Menu1,,QuitMenu ' Note that the 2nd possibility
                                     ' doesn't GOSUB anywhere.
                                     ' This is because menu #2 is
                                     ' non-selectable (see
                                     ' InitMenus) if#2 was used,
                                     ' you would put an entry
                                     ' there.

  RETURN

Menu1:

    ' This routine resets menu #1 and puts a checkmark to the left of
    ' the MenuItem that you selected. You MUST do it this way each
    ' time or AmigaBASIC won't remove the checkmark from any
    ' previously checked Item.

MENU OFF

    ' Prevents the user from interrupting the update. This turns the
    ' menu button on the mouse off. Otherwise, it is possible for
    ' the user to interrupt the menu reconstruction.

LOCATE 6,1
COLOR 3,0 :
PRINT " You selected MENU 1, item #";MenuItem% : COLOR 1,0
PRINT CHR$(7); ' BEEP sticks sometimes. CHR$(07) is the ASCII BELL.
IF MenuItem% = 1 THEN
MENU 1,0,1,"First Menu"
  MENU 1,1,2,"  First Item"
  MENU 1,2,1,"  Second Item"
  MENU 1,3,1,"  Third Item"
  MENU 1,4,0,"  Can't Select it!"
END IF
IF MenuItem% = 2 THEN
MENU 1,0,1,"First Menu"
  MENU 1,1,1,"  First Item"
  MENU 1,2,2,"  Second Item"
```

Continued on pg. 64

JIFFIES/BORDER PATROL

Continued from pg. 54

```
    169'BFFF
240 DATA 4,141,154,192,169,216,141,
    163'BEGG
250 DATA 192,32,147,192,160,39,173,
    226'BEOH
260 DATA 192,153,192,7,32,188,192,
    173'BDBH
270 DATA 224,192,153,192,219,136,16,
    238'BFOJ
280 DATA 108,220,192,162,23,173,226,
    192'BFDK
290 DATA 141,39,4,32,188,192,173,
    224'BCSK
300 DATA 192,141,39,216,173,153,192,
    24'BEKD
310 DATA 105,40,141,153,192,141,162,
    192'BFUE
320 DATA 144,6,238,154,192,238,163,
    192'BESF
330 DATA 202,16,218,96,152,72,138,
    72'BCSF
340 DATA 206,223,192,16,9,173,227,
    192'BDSG
350 DATA 141,223,192,206,223,192,172,
    223'BGXI
360 DATA 192,185,228,192,141,224,192,
    104'BGKJ
370 DATA 170,104,168,96'BOPH
```

END

AMIGA BASIC TUTORIAL

Continued from pg. 62

```
  MENU 1,3,1," Third Item"
  MENU 1,4,0," Can't Select it!"
END IF
IF MenuItem% = 3 THEN
MENU 1,0,1,"First Menu"
  MENU 1,1,1," First Item"
  MENU 1,2,1," Second Item"
  MENU 1,3,2," Third Item"
  MENU 1,4,0," Can't Select it!"
END IF
MENU ON ' We're through, so reactivate the menu button.
RETURN

QuitMenu:

LOCATE 6,1 : PRINT CHR$(7); ' BEEP sticks sometimes!
PRINT " You have chosen to return to BASIC."
FOR Delay = 1 to 4500 : NEXT Delay
WINDOW CLOSE 2 : SCREEN CLOSE 1 : MENU RESET
STOP
  ' This file is being presented as an aid to prospective
  ' AmigaBASIC programmers. I am interested in spreading the use
  ' of language because of its extreme versatility.

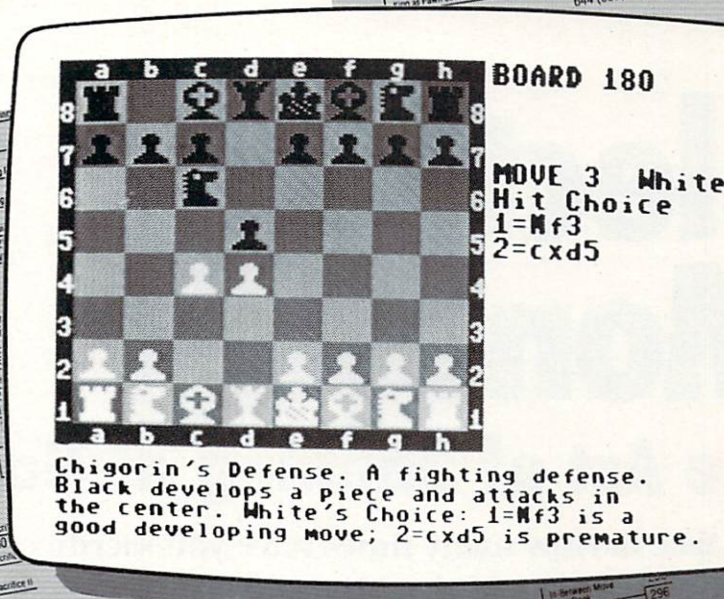
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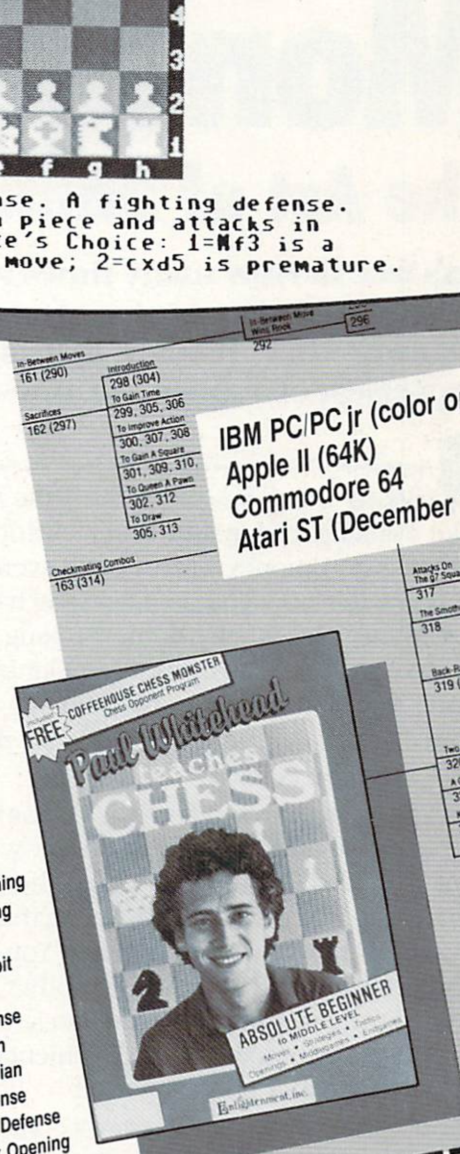
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Electronic Money

The Art of Banking at Home

by Gary V. Fields

Let's face it. How many times have you sacrificed lunch hours and endured slow-moving lines to transfer money from your savings account to your checking account? That's history. Just as man swapped his saddle atop a horse for the bucketseat of a sports car, one day you may trade your checkbook for a keyboard.

Drive-in windows were the first attempt to make banking easier and faster. Automatic bank machines and money access cards were the next. But no matter how you do it, you still have to leave your home. This is why home banking is the logical next step. If you think I'm talking about the future, you're wrong—home banking is here at affordable prices. The time to discard those paper checks may be at hand.

Several banks now offer their customers the option of banking via a home computer wired directly to the bank's computer. Once the bank's data base is accessed, you can do everything short of physically touching your money. You can move money from one account to another, check account balances, check interest rates, or pay bills. For some customers, this convenience will save not only time, but money as well.

About three years ago at a news conference held at the University of North Carolina, local bank officials released plans to offer home banking to their customers. Little notice was made of the announcement, because after all, not as many homes contained personal computers back then, and if they did, it was assumed that they were more often used to keep track of *Pac Man* than paychecks. But times have changed, and the "toy" computer has been replaced with the "tool" computer.

Of course, the simple existence of a service doesn't necessarily justify your using it. Before you make the plunge, here are some important questions to answer.

Who Needs Home Banking?

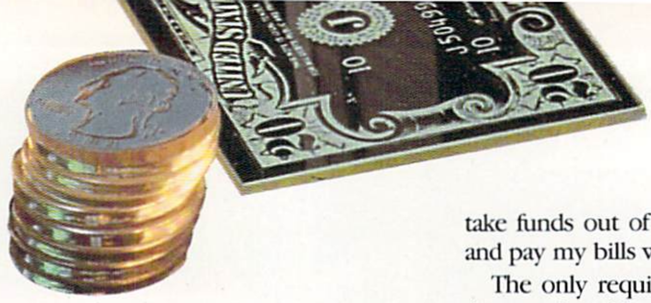
Imagine this: It is Friday afternoon. You need to be in Chicago early Monday morning for business. As the banks close for the weekend, the transmission of your car begins to chew metal. The mechanic says he'll work late to fix your car, but he won't extend you credit.

How will you pay the repair bill? You drained your checking account for traveler's checks for the business trip, and with the banks closed, you can't get into your savings. If you write the mechanic a check, it will bounce, but if you pay him in traveler's checks, you won't be able to afford your trip. How can you transfer funds from your savings account into your checking to cover the overdraw and still be in Chicago on time?

Well, the simplest solution is to break into the bank and move enough money from your savings account into your checking account to cover the transmission bill. Home banking is the legal way to do just that.

People who can easily justify the expense of home banking are business people who can't afford to wait for the banks to open to do business. Others who can benefit are handicapped or elderly people. And people who don't live near a bank may find the time and expense to travel to the bank may exceed the cost of home banking.


commodore



Another group who can benefit from this service are those who write a lot of checks. This is because the bank will pay your bills for you. This means that you save both the time you would spend writing and mailing paper checks, plus the postage. And even if you don't qualify for free checking, you'll still save about 40% on each check you send electronically because most banks charge less to process an electronic debit.

In short, convenience is the primary reason for using home banking. When you bank at home, you are free to bank when it is convenient for you, regardless of whether that is three o'clock in the afternoon or three o'clock in the morning. The same is true of holidays—home banks never close. But the reason I like home banking is that I love a bargain and I hate writing checks to pay bills.

Signing Up

When I walked into the Asheville branch of the North Carolina National Bank (NCNB) to get details about home banking, I figured I'd be able to sign up and be out in under a half hour. However, I was wrong.

Instead of being able to sign up at the local office, all I could get there was an application form which had to be sent to NCNB's main office in Charlotte. I was a little disappointed about this delay, but it gave me a chance to give the home banking demonstration terminal in the bank's lobby a try. As I left the bank, I dropped my application in a mailbox and went home to wait.

The wait lasted only six days. On the seventh day I had the information I needed. I sat down with the package and double-checked what I needed: a computer, telecommunications software, private telephone line, modem and a subscription to CompuServe. Home banking could be expensive, I thought. I had considered subscribing to CompuServe before, but the initial log-on fee always stopped me short. I was beginning to have second thoughts.

I telephoned the bank to check about the cost of the subscription to CompuServe, hoping that they would tell me home bankers got some special group rate. I was right, they do—it's free. Well, I couldn't complain about that price. And when I learned that the bank would also pay my first $15 in on-line access charges, I was delighted. This home banking deal was beginning to sound very appealing.

Then I was told that the bank's fixed monthly fee for the first three months was waived. This sounded almost too good to be true. First the bank gives me a subscription to CompuServe and $15 to spend on CompuServe, then kicks in free banking for three months. Where's the catch, I asked myself.

The catch is the service. The bank was so sure I would love home banking that they were willing to risk their own money to show it off. I had nothing to lose since the trial run was free. Plus, regardless of what I decided, I got CompuServe free. How could I refuse?

Because I was a new user of CompuServe, I had to sign on to it before I could access my new NCNB electronic banking account. That was pretty simple. After finding the local access number for my location, I booted up my terminal program, dialed the service and answered a few prompts for things like ID number, password, terminal type, and baud rate. All the information I needed was in the package the bank sent.

I had been told that I could go directly to the NCNB section of CompuServe by typing GO NCB at any prompt. But once on, I was in no hurry to rush to the bank. When I finally got around to typing GO NCB, the bank's door swung open to welcome me in a matter of seconds. But before I could do business I had to identify myself to the bank's security guard. First I typed my bank ID number. The guard recognized the number and asked for the password. Misunderstanding, I entered my CompuServe password by mistake. Instead of slamming the door in my face when I offered the wrong password, the guard allowed me to try again. On the second try I entered the correct word and I was in.

The next prompt led me to what I think is the nicest feature of home banking—free bill paying. You are prompted to enter the names and addresses of clients, companies, individuals, shops and utilities that you send checks to regularly. I entered the name and address of the water department, telephone, electric and mortgage companies, GMAC and Sears. Then I can instruct the bank to take funds out of my checking account and pay my bills when they come due.

The only requirement is that I signal the transfer of funds five days before the bill is due. This allows the bank time to either electronically transfer funds to cover my bills, or if the company or person doesn't have an account with NCNB, the bank must cut a regular paper check and send it by mail. I love the idea of someone else writing checks, addressing envelopes and licking stamps to pay my bills instead of me!

Can you imagine a bank paying routine bills for you postage-free simply because you bank at home instead of showing up in their lobby?

Once you have entered all the names and addresses, you are presented home banking's main menu. (The whole service is menu-driven and simple to use, even if you've never used a computer before.) This menu lists six services: Checking, Saving, Bill Payment, Funds Transfer, Credit Card, and Customer Service. Moving between the services is simple since all you need do is enter the number preceding the service and press RETURN.

I called up Checking first. There I was able to see exactly how much money I had on hand and what my credit reserve was, as well as review the account's activity (when the last deposit was made and in what amount, and so on). I need only one checking account, but if you have more, the bank can accommodate them just as well.

Next I had a look at my savings account. The screen responded with the account number, balance data, balance, interest earned, that day's activity, and information about the most recent activity there (the check I had deposited that morning had already been credited).

As I said before, the Bill Payment Service is the area I appreciate the most. Pressing the number 3 at the main menu brings up the bill-paying section. There I was offered five new options: pay bills,

review pending payments, cancel payments, review year-to-date payments, or call up the Payees Index.

The Payees Index lets me add or change information about the people I will have the bank send checks to. The other menu headings offer the information and options their names suggest. Sensibly, the bill-paying options have multiple error-prevention safe-guards, so there is no way to either accidentally send a check to the wrong address or send a check for the wrong amount.

The Funds Transfer options can be a real lifesaver if you ever find yourself in a situation where you need money for an emergency or a bargain. Here you are free to shift money between any of your checking or savings accounts until you have your money distributed where you need it.

If you sometimes push your credit cards to the limit, you'll appreciate the information you can get from the Credit Card Index. Here you can review the status of your credit card accounts as well as double-check the credit line each carries. While I make it a rule to never pay interest on a credit card, I do appreciate the convenience of using my cards, especially when buying merchandise by phone. By reviewing the information here, I can be sure the purchase I want to make won't cause my total for the month to exceed my credit line. (A quick look can usually quickly convince me that I can't afford something.)

Is Home Banking Affordable?

To accurately reflect the cost of home banking, I divide the cost into two categories: dollars and time.

I was surprised by the service's cost. When the products manager at NCNB told me I would be charged $12 per month for home banking, plus I would have to pay $4.25 per hour to CompuServe while in the banking section, in addition to the charge for each check I wrote, I was ready to say, "Thanks, but no thanks." And by the same token, consider buying a modem and terminal program if you don't already have them.

However, once I got over the financial blast, things began to look more promising. Those charges are the maximum charges possible. Just as minimum balances kept in a regular savings account can reduce the cost of checking, different balances can also reduce the charges of home banking. By keeping a minimum of $500 in my regular savings account, my account with NCNB costs only $12 per month (after the three-month trial).

The best way I found of reducing the cost of home banking is to let the bank pay my bills. Can you imagine that—a bank paying routine bills for you (postage free) simply because you bank at home instead of showing up in their lobby? (Friends have tried to suggest the bank was willing to go to this extreme simply to keep me out of their lobby, but I've tried to suppress that thought.) What I found amazing about this service is that it is actually cheaper than paying by checks. This is possible because a debit (or check) assigned to your home banking account costs less than a paper check. Plus, the bank does all the paperwork and even pays the postage.

If you consider your time valuable, you may be able to justify the cost of home banking simply by the amount of time it saves you. If your time is too valuable to waste standing in your bank waiting for your turn, home banking is a service worth considering. For instance, if you earn $12 per hour and spend two hours a month driving to and from the bank, you are already wasting $24 worth of time each month doing your banking. And don't forget to add all the hidden costs like gas, parking and postage.

I figure the savings I will incur from gas for my car and parking charges, combined with what I'll save on postage and envelopes (not to mention time) by having the bank pay most of my bills, will cover the monthly fees. Because the newspaper where I work deposits my check directly, there is no reason for me to ever go downtown to bank unless I want to. The only cost I can't quickly balance is the on-line charges of CompuServe, which add another $4 to $5 to the monthly total. So while I couldn't call the service free, I do consider its cost as dollars well spent.

The costs quoted here were those in effect at the writing of this article and are only applicable to the services offered by NCNB. The charges and services offered by other banks may differ.



Home Banking First Aid

1. When you first access your bank via a network, set your baud rate at 300, even if you have a modem capable of 1200 baud. I suggest this because when you first log on, you'll spend more time learning your way around the system than actually accessing services. If you did this exploring at 1200 baud, you would spend the $15 on-line credit twice as fast as at 300. Initially, your knowledge of the service, not the system's speed, will determine how fast you get on-and off-line. Later when you know the system better, switch to 1200 baud and save money.

2. Shop around. Different banks offer different services and different rates regardless of whether the banking is being done electronically or across a counter. Just as you might select one bank over another because of the minimum deposit required for free checking or the availability of free traveler's checks, the same is true of on-line banking. Check each bank's rates and services before opening an account.

3. Just as some banks offer free toasters for opening a new savings account, some banks offer free items or services for opening a home banking account. For instance, Citibank of New York promoted their version of home banking by offering Commodore users free modems.

4. If you have doubts about whether you would really benefit from home banking, ask the bank for a demonstration. Some banks (NCNB included) have computers set up in their lobby so customers can test their system.

5. If you are already a CompuServe user, you'll find five banks there where you can explore home banking via on-line demonstrations. They are the Huntington National Bank (GO HNB), North Carolina National Bank (GO NCB), Shawmut Bank (GO SHW), Southeast Bank (GO SEB) and United American Bank (GO UAB).

6. If you still have doubts, check with the bank's product manager about promotional packages. To attract new customers, some banks will actually let you try home banking free for several months so you can try the new service without risk. But let me warn you about these "trial rides"—test driving home banking is a lot like trying out a new car—one you've experienced the ride, you'll find it difficult to resist the urge to buy. C

Big Name Hunting in America

PART 1
Exploring the Licensing Jungle

by John Jermaine

Licensing is the newest game in Commodore software. Who can be the first to purchase the hottest titles for projects that now exist only on the drawingboards? G.I. Joe™, Mickey Mouse™ and Godzilla™ have all been immortalized in Commodore programs. How does licensing work? What major deals have fallen through at the last moment? These are just some of the questions discussed here in part one of a two-part look at the licensing phenomenon.



G.I. Joe and Barbie™ Meet Godzilla

Bob Botch, Vice President of Marketing at Epyx, explains how Epyx has become one of the top licensing kings.

Jermaine: What exactly is licensing?

Botch: A license is merely a written agreement between two parties which allows a company like Epyx to legally use a famous character or theme in a software project. Licenses are put together in much the same way that a union negotiates a contract. People from both sides meet and discuss the issues, and when a bargain is reached, a contract is drawn.

There are several different forms of licensing. The most common type of license is known as a character license. Epyx wanted the name and likeness of Godzilla for *The Movie Monster Game*, so we purchased only those rights. Some companies acquire the title of a popular book or movie and then may go a step further: They obtain the right to pattern their program after the plot of that book or movie.

For example, Spinnaker went so far as to have Michael Crichton write the plot of the *Amazon* graphic adventure game for their Telarium series based upon his book by the same title. Datasoft developed programs based upon the movies The Neverending Story and The Goonies. And many software houses have licensed and developed arcade games by purchasing the rights to toy titles like Epyx did with Barbie, G.I. Joe and Hot Wheels™.

These are the common forms of licensing that most of us are aware of. But there are others. Epyx has a special license agreement with Lucasfilm Games which allows us to purchase certain programs written by the group to market and advertise under the Epyx label.

As you probably know, Epyx software is sold around the world. We could manufacture enough material to meet worldwide demands and send it abroad, but the duties and import tariffs would cut down the profit margin significantly. To counter this, Epyx has developed a licensing program which literally sets up companies in foreign lands to become the Epyx of their country. They have the right to manufacture, advertise and market our products under our guidelines.

Jermaine: Has one of Epyx's foreign distributors ever needed to alter the software to fit that culture?

Botch: Our representative in Japan has the right to make minor changes in Epyx software because the Japanese market is so different from ours. Most of the time they make simple requests, like wanting to replace a color on the package or title screen and substitute a bright yellow or red in its place. A couple of times, they've wanted to give a character in one of our games a Japanese appearance. Whatever the changes are, they must present their case to us and justify the change. We still have final say on the matter.

Jermaine: In general, what are the terms of a license?

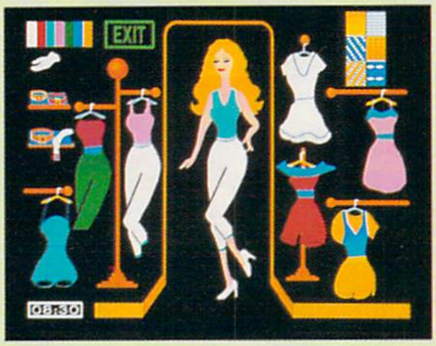
Botch: The issues covered in license contracts can vary quite a bit, but two standard elements are found in most of them. First of all, each contract contains a clause which defines a percentage of each sale that goes directly to the licensor. This figure can be almost any amount of money, depending upon the strength of the title. Secondly, the agreement states the length of time that the license exists. We usually ask for two years. A supportive statement establishes a commitment where a minimum



of product sales must be made in the first year, for the license to continue into the second one.

Jermaine: What are the people like who negotiate license agreements, and what do they expect of you?

Botch: The groups handling the license contracts are as different as night and day. In some cases, they can be very rigid when it gets down to what we can and cannot do with their characters or titles. G.I. Joe was an interesting project because of the "strings" attached to the title. As most of you know, tanks are blown up and planes explode in the G.I. Joe cartoon series, but no one is ever seriously injured or killed. The challenge our designers faced was to create software that was action-packed yet remain true to the G.I. Joe myth. Believe me, that was a tough order to fill.



Many popular titles, like G.I. Joe and Barbie, also have distinctive logos. In cases like these, we're expected to duplicate the logo design and use it within our program. In some instances, certain colors must also be incorporated into a character or logo. Most of these agents provide artwork for our inspection, leaving other matters to our imagination and the terms of the agreement.

You never really know what to expect when you're negotiating a contract. Sometimes a firm will simply ask us to spell the name of their property correctly and send them the royalty checks.

Jermaine: What is the basic sequence of events that leads to the signing of a license agreement?

Botch: All of our licensing projects have a common origin. Individuals from Epyx are constantly looking around for new and interesting game topics. Once we have an idea in mind, our next step involves tracking down the owner(s) of the title in question. Sometimes Epyx deals directly with an agent who negotiates contracts for many different license properties. At other times, we've had to contact the parent company of a title just to find out who takes care of negotiating their license agreements.

"Many popular titles like G.I. Joe and Barbie have distinctive logos we are expected to duplicate and use within the program."

Whenever we finally approach the proper people and discuss putting one of their characters or creations in a computer game, we usually catch them totally by surprise. If our people have done enough research on the matter at this stage, Epyx will probably make a proposal. This statement outlines what we'd like to do with the character and what we're willing to pay for the privilege.

Once in a while, agents approach the software companies with the license to a hot character or movie title. When this happens, they usually submit a product concept or quote us a solid price for the license itself.

In any case, contract negotiations can be lengthy and complex, or as simple as saying yes we can do something under these conditions or no we can't agree to them.

Jermaine: Have there been any license agreements that Epyx had to pass on?

Botch: Two items come to mind right away. We wanted to purchase the rights to the book/movie title Dune for a new software project. We negotiated with an agent for a couple of weeks, and discovered that we didn't need to talk with him any longer—Atari had purchased the license for Dune three months before we had even spoken to our contact.

And for a long time Epyx was very interested in The Transformers™, but we backed out of buying the license at the last minute. Even though all of the major issues had been settled, we asked for some extra time to look things over. Our additional research uncovered the fact The Transformers appeals to an audience 12 years-old and younger, while we gear most of our software to the 12 year-old and older crowd. I'm sure that a title of this nature would do well in the form of a video cartridge game, but it just didn't fit our image.

Jermaine: What can you tell me about the licensing of Godzilla for *The Movie Monster Game*?

Botch: In the beginning, *The Movie Monster Game* was slated to feature a selection of totally original creatures. As the program evolved, however, we found ourselves developing a character which closely resembled Godzilla. Our people had reached a point where they had to make some quick decisions. Would it be to our advantage to license Godzilla for the game, and if we went this far, could we pick up the rights to other famous movie monsters for the program?

Research on the subject revealed that Godzilla is one of the most popular movie monsters in existence. A new Godzilla movie was released in 1985, Dr. Pepper™ has produced two commercials featuring the giant lizard, and toy makers continue to manufacture representations of the creature. These were all good signs that the public was interested in him.

Negotiations for this license went very well because we were far enough along with the program to show the Godzilla licensing agent exactly what we wanted to do with their character. Our people even had a sample of the packaging art for his inspection. Another factor in our favor was the fact that the agent repre-



senting Soho Co. Ltd. had been marketing the title for some time. We came to an early agreement without encountering a major stumbling block.

Jermaine: We've discussed the positive aspects of putting Godzilla into one of your games. Did you have any negative aspects?

Botch: Yes, we did. Epyx was very sensitive to the fact that Godzilla has traditionally been a bad monster. He destroys private property and occasionally eats or kills human beings. We were so concerned with public's reaction to our project that we tested *The Movie Monster Game* concept on a group of parents. Some of them gave us a negative response, but the majority of the adults accepted the material as a light-hearted spoof. There is no point in the program where people are eaten or come to an equally terrible end. Epyx has always projected a positive software image that allows any member of the family to use our products.

Jermaine: Did you consider licensing big name wrestlers for *Championship Wrestling*?



Botch: Yes, we did. However, in this case, the negative factors outweighed the positive. If we licensed a character like Hulk Hogan, for example, we would be restricted in how he could look on the screen and what he was capable of doing. Two licensed names would increase our woes because both individuals would want top billing, and sooner or later we'd have to determine which character was stronger. So to keep things simple for our game designers and marketing people, Epyx decided to create totally new wrestlers for the program. After all, we could incorporate any traits we liked from the real wrestlers into an original character. Our programmers also had more room to be creative and not worry about the stipulations of a contract.

B.C., Jen and Disney

Sierra On-Line, based in Coarsegold, California, has also had some interesting licensing experiences. John Williams, a member of their licensing staff, agreed to discuss this aspect of their business.

"Disney, the masters of modern film animation, had difficulty adjusting to the realities of a 180 x 250 line screen."

Jermaine: Can you give me an idea of what it costs to license a property for a piece of software?

Williams: To put the answer in perspective, you need to know some of the costs of developing and manufacturiing software. In this example, let's examine an average program created under ideal conditions. These expenditures reflect actual figures.

This fictional software is called *Riders of the Storm* and retails for $25. Dealer profit alone amounts to 40% or $10, which reduces our money from $25 to $15. Distributor profit is another 15% reduction or $3.75, which leaves us $11.25 to work with. Co-op advertising, ads retailers run featuring our products (Toys R Us™ is a good example), costs us $.75, bringing the gross profit of a single piece of software to $10.50. Packing costs amount to $2.50 per package, bringing our new total to $8.

Now, most of our projects have two programmers working on them. Each programmer is paid approximately $2,000 a month for an average of five months per project. Programmers also get an estimated 15% royalty from the $8 gross profit after the materials have been paid for. You may may think that we overpay our programmers, but be realistic: Any programmer good enough to work for Sierra On-Line could easily go out and get a $40,000 a year job at one of the local utility companies.

Two quality assurance people are pulled into the project to debug the program. These people are paid approximately $1,200 a month for about six weeks' work. Add to these costs legal fees, magazine advertising, office overhead, computer repair and maintenance, and you're talking about our profit being terrifically reduced.

Just to break even on development costs alone for this imaginary program, we would have to sell 3,418 units at $25 a package. At Sierra On-Line we won't touch a project unless we can sell at least 15,000 copies per machine, which is the break-even point on all costs.

Now, if we're developing a program where a license is involved, take another 10% off the top (sometimes more) for royalties which go directly to the owner of the license. The licensing rights to *Frogger* alone cost us over a quarter of a million dollars. We also paid approximately one million dollars to license the Disney name for a three-year period.

Jermaine: Speaking of Disney, how did you become involved with them?

Williams: Sierra On-Line and Disney got together as a result of the fall of Texas Instruments and their microcomputer, the TI/99. Texas Instruments had an agreement with Walt Disney Productions to create educational software for the TI/99 over a two-year period. When it became obvious that the Texas Instruments system was dying in the market. Texas Instruments helped Disney search for a well known software company that would "assume" their obligation and produce Disney-quality material. Our company fit that bill. The actual contract was signed at the 1984 Winter CES Show in Las Vegas.

Jermaine: What have you learned from working with the Disney people?

Williams: Dealing with the Disney personal computer software staff has been an education for everyone at Sierra On-Line. The situation with Disney that makes our software projects so special is the fact that we're not merely licensors of the Walt Disney name, but we have a co-development arrangement. Simply put, Disney has input into programs containing their characters from conception to completion, with a final right of approval over everything in the software.

When Sierra began working with the Disney designers, it was an experience for both. The Disney team had some things to learn about computers. They didn't know about things like color limitations on different systems, how much animation can happen on a screen at a given moment, and that basically, each microcomputer has its own limitations. Understandably, the Disney designers

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LIGHTS... CAMERA
A·C·T·I·O·N

Commodore Computers in Hollywood





by Matthew Leeds

From a distance, Hollywood is all glitz and glitter. Stars come and go, million-dollar deals are negotiated, and movies are filmed. Behind the scenes, however, is a tremendous amount of hard work. Enter the Commodore 64 and Amiga computers.

Synchronizing Soundtracks

The creation of a film's soundtrack is an immense task. Music is used to accompany and accent action, foreshadow events and add impact. The score must parallel the action perfectly, following the pace and tempo, changing speed to match the rhythm. The task of coordinating the peaks in the music with the dramatic points in the script used to be done by hand, using programmable metronomes, Knudson click track books, calculators—and a tremendous amount of time.

The synchronization of sound in film is done to the frames and sprockets on the film. Thirty-five millimeter movie film is run at 24 frames per second. The standard measurement of a time-frame is therefore 24 frames per second. Each frame has eight sprocket holes.

Now imagine that you're a composer trying to key a piece of music to a scene. The music has already been created, set to a 3/4 tempo. The scene has already been created, and the point in the action that you have to match the music to occurs 327 frames into the scene. You have to find a new tempo that will match the musical highpoint of the score to the dramatic "hit" in the scene.

Now imagine that there are several "hits" that have to be matched, and the time between them does not match the time between the high points in the score. You need to have variable tempos in the score. And, oh yes, the film editor has just recut the film and your score is due in two days.

This is what Richard and Ron Grant of Auricle Control Systems were up against when they decided to create a software program on a Commodore 64 to simplify this process. While working on the program, they realized that just designing software to solve the problem wasn't enough. They had to find a way to make it simple to use. The result is *The Film Composer's Time Processor.*

The remarkable success of *The Time Processor* is due not only to the amount of time it can save a composer, but the ease with which it can be learned. It uses a menu-less command structure that can be customized. For example, if you want to re-time a bar, just say so. The program will understand your command, and you can change the name of any command to anything you prefer.

The Time Processor can be interfaced to synthesizers or drum machines to supply a "clock" that drives them at perfect time. It has been used in Dynasty, Dallas, Karate Kid, the Ewok Special, Amazing Stories, Silverado, Knight Rider, St. Elsewhere, The Color Purple, Knots Landing and American Flyers.

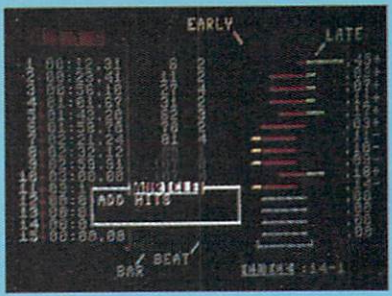
In 1985 Richard and Ron Grant won an Emmy Award for outstanding achievement in engineering development. They have now been nominated for an Academy award for Scientific and Technical

CHUCK BARTHOLOMEW

Achievement. But this is only one way the 64 is used for film production.

Controlling Lights

Union Connector Company took the BSR X-10 appliance controller, applied it to lighting control systems and added an interface to allow the 64 to control the lights on-stage. This system uses modular remote-controlled individual dimmers to handle the high-power requirements of stage lighting. Each module is addressed by a digital R/F signal sent over the existing electrical wiring. The 64 is connected to an interface called the Digi-64. Using Union Connector's *StagePro* software, up to 48 dimmers can be controlled, with 48 separate scene lighting setups preset and 4 lighting chase sequences stored on disk. Each dimmer can be set to one of 16 levels of illumination or turned on or off using the controller. Dimmers that handle one, two, six or twelve kilowatts of power are available.



The Film Composers Time Processor.

Teleprompting

The 64 is used in other performance-related ways, as well. Telescript has created a complete teleprompting system controlled by a 64. A teleprompter displays text in a large typeface and scrolls it at a controlled rate so the speaker can read a prepared speech to a gathering without referring to handwritten notes. Many systems use a half-silvered mirror and a video monitor, set up in such a way that the speaker can see both the text on the monitor and can look out through the mirror to see the audience as well.

Using the 64, the Telescript system can edit, store, recall and display scripts, as well as produce hard copy. Although a complete system can run into the thousands of dollars, it's interesting to see that the heart of the package is a 64.

Slide Shows

Not all productions are big budget feature films, however. There are a lot of multi-media presentations by corporations, retailers and industry in which hundreds of slides are used in a single presentation, and keeping track of them can be a tremendous task. *Slide-Finder* is an interactive slide-filing system that not only creates a data base for tracking your slides, but controls a slide projector to find and display each slide as you call it up. Records can be searched by any field and reports can be printed.

The core of the system is the PC/I Projector Control Interface controlled by a 64. The developers of *Slide-Finder*, Interactive Technology, are also producing software-authoring and production tools for the creation of multi-projector slide presentations.

Although a complete system can run into thousands of dollars, it is interesting to see that the heart of the package is a Commodore 64.

The 64 is being put to use in many other applications in the entertainment field, such as titling of videos, script and budget preparation, storyboarding and video animation, just to name a few. Take a close look at the next television or feature film, and you just may find a 64 hidden in the wings.

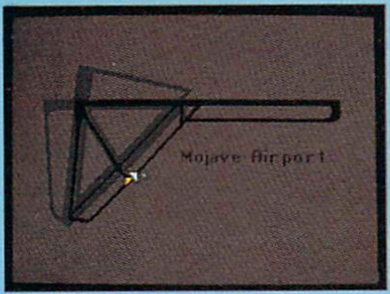
Amazing Amigas in Amazing Stories

I'm standing in the "gold shack" on the set of the weekly TV series Amazing Stories watching video monitors display a set of graphs and charts, part of the special effects being used in the episode being filmed. The gold shack is so named because of the value of the video and computer equipment it contains. The newest addition to the shack is a pair of Amiga computers, being used to create a digital look to an actor's face while he acts.

Art director Richard Lewis explained to me that the Amazing Stories' director had been looking for a certain effect to add realism to the storyline. They explored alternatives for the effect using traditional computer-based special effects equipment, but were unable to create the look they needed in real-time.

The real-time element was especially important. "You lose a lot if an actor has to act to a videotape of another actor's performance," Lewis explained. "We needed a way to keep the freshness and spontaneity between two people. The Amiga gave us the look we wanted, kept the real-time element alive, and came in at a budget that was a fraction of the cost of any other system."

The first thing Lewis did was to call in Aegis Development, a software developer for the Amiga, to supply computer hardware and to provide the technical expertise. Aegis' approach was to place



Airfield drawn with Aegis Images.

the actor on a separate set with a video camera supplying a live feed to the gold shack. The video signal is fed into an Amiga through a video digitizer. The digitized signal is then fed into a Fairlight SEG to create additional special effects.

The video signal is then fed into a second Amiga through a genlock device. The second Amiga creates text overlays on the digitized video signal. The text itself is created by an AmigaBASIC program, and can be changed by hitting different keys on the keyboard. The final video signal is sent out to the main set and rear-projected onto a very large screen where an actress can react to it as if it were a live actor (which in fact it is). Her actions are also captured by a video camera and sent to a monitor on the first set so the first actor may see her perform.

The whole effect is stunning. I'd love to tell you more, but I've been sworn to secrecy until the episode airs. When it does, I'm certain you'll recognize the set. You'll see Amigas on the set, though their nameplates will be covered.

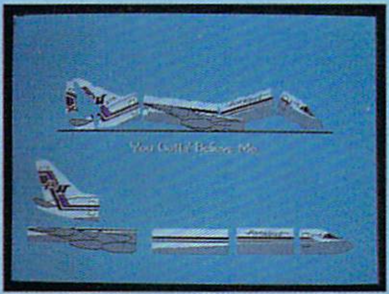
More Uses for the Amiga

After the day's filming on Amazing Stories, I sat with Richard Lewis and discussed what other uses Amigas have in the film industry.

Leeds: What got you started using the Amiga?

Lewis: We first began using the Amiga to communicate with directors on set design. People who direct our episodes are working on a variety of projects at the same time. You don't get them for a lot of time; you get them for only a few minutes—and in those few minutes you have to find out what you need very quickly. If you miss that opportunity, it may be a day or two before you see them again. And you certainly need all the time you can get to plan and design.

Leeds: Can you give me a specific example of how the Amiga helped you communicate with the directors?



Modified tracing of a Convair 880.

Lewis: We did a story that involved an airfield and some planes taxiing around. We got a photocopy of the airfield layout and traced it using *Aegis Images* on the Kurta graphics pad. This gave us an accurate representation of the runways. We then added a jetliner, smaller aircraft and van that took part in the story. The runways cover two miles of area, and we needed to know where everyone was going and how long it would take. We also had to position the lights for the night shots. Now we were talking a lot of lights and a long setup—at least four or five nights in a row.

Using *Aegis Animator*, we could see the relative movements of each element in the scene and could get a feel for where problems could occur. This way the director could see changes he wanted to make and convey them to us.

This technique can be used in any action scene. We used to use plastic models of cars and planes and push them around on a large drawing of the set. But by using the Amiga we can dump the setup onto videotape and give a copy to the director of photography, the stunt coordinator, and anyone else who needs to know the action sequence.

In the same episode we were using a Convair 880 airplane. I took a brochure from the company and traced the airplane. I could then come up with a color scheme for the plane that fit with the rest of the story. Using *Deluxe Paint* from Electronic Arts, I could design a logo, slant the letters using shear, and put in the styling lines and other elements to flesh out the art on the plane.

Leeds: Can you give me some other examples of how the Amiga has made it easier for you to work with directors?

Lewis: Well, I took some photos of a house we were using for an episode, put them on the Kurta graphics pad, and traced the house in. I could then try different paint schemes and show them to the director. I could also change the colors while the director was watching until the combinations were just what he wanted. We then matched paint samples against the colors on the screen.

> *"The Amiga is the first computer that has the kind of features that make it usable for applications I use on a daily basis."*

Another episode came up later in which we wanted to use the same house but make it look different. With just a slight modification to the doorway, some gingerbread and a change in color, we had a different house. And in the second episode we needed the house to have a spooky character. This time the whole set was done in shades of gray.

Leeds: You've got quite a lot of equipment set up on your desk. What are you presently using with your Amiga?

Lewis: In terms of hardware, I've got a Tecmar 20 megabyte hard disk drive with a T-Card that has 1 megabyte of RAM, a Kurta series 2-bit graphics pad, and a Digiview video digitizer. For software I use *Aegis Animator, Aegis Images* and *Aegis Draw*. I also use *Deluxe Paint* and *Deluxe Video* from Electronic Arts. For a spreadsheet I use *Analyze* (Brown-Wagh), for word processing I've used *Textcraft* by Commodore, but I've recently switched to *Scribble* (Brown-Wagh). I also use *Flow* (New Horizons Software) quite a bit.

Leeds: What kinds of things are you using the non-graphics software for?

Lewis: I use *Flow* a lot instead of a word processor. For instance, I use it while looking at a new script, trying to break scenes down into the elements. I then use *Analyze* to budget out the cost of doing each element in the script. Being able to have both programs running at the same time saves me a lot of time. I can read through a script for the first time, make notes, and build a preliminary budget all at the same time.

Leeds: Have you been using Digiview?

Lewis: We had one story where the main character had been an avid world traveler in his youth and we needed to create some photographs that would show his travels. We got some photos from several stock agencies and planned to photocomposite his face onto the image. I wanted to check the layout, so I used the Digiview to digitize the stock photo, and then digitized a photo of my face. Using *Deluxe Paint* I could put my face in the photo and then take screenshots of the results. We gave the screenshots to the retoucher who was doing the final compositing and told him to use them as a guide. In reality, some of the stuff we did with the Digiview was good enough to use as is. If we had not needed 8 X 10's, we might have been able to use the shots right off the screen.



House color and details are chosen.

Leeds: You also mentioned *Aegis Draw*.

Lewis: With *Aegis Draw* I can draw a stage plan, save it as one file, then draw a set and save it as another. This way I can try different positions with that set on the stage to see which works best, seeing whether there may be problems relative to camera placement or lighting. Normally we would do that with paper and pencil, but using *Aegis Draw* makes it simpler. It's the first computer-aided design system that is easy enough to be usable in this industry. We have a lot of turnover and can't take a lot of time to train someone on a system.

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BY SHAY ADDAMS

Mapping Made Simple: *Labyrinth* and *Amnesia*

News and opinion from a leading explorer of those fantasy realms called adventure games.

From 1982 until 1985, I was lost in the maze in *Zork I*, so I'm glad to see contemporary game designers are making their worlds easier to map. Two recent examples are *Amnesia* and *Labyrinth*.

Labyrinth is an animated game that is practically all-maze. But a special overhead view enables you to see an aerial view of the current hall so it can be copied on paper. Based on the Jim Henson Muppet film, *Labyrinth* opens with a brief all-text game in which you must find your way to the theater where the film is showing.

In a bordered box like those seen in silent movies, the first illustration announces "The Movie Begins." Then the Goblin appears and speaks directly to you from the screen. He even uses your name, which you type in along with other information before the game. The Goblin presents the challenge: You have been transported into his labyrinth, where you will remain imprisoned unless you vanquish him at the center of the maze. There's a 13-hour time limit, and you can always type "time" to find out how much you've got left.

The next phase of the program is automatically loaded and animation kicks in. A 2½-inch tall character stands in the middle of a long brick-lined hall. Depending on your previous input, the character will be male or female, have hair the color you stated, and will be wearing a shirt that's your favorite color. Now you can guide the character about the halls by moving the joystick. To simulate 3-D, the program enables you to move forward and backward as well as left and right. The graphics are similar to those seen in *Habitat*, QuantumLink's on-line adventure (both are produced by Lucasfilm Games).

Below the graphics, which cover most of the screen, you'll see a long thin bar that represents the hall you're in. A blinking square shows your current location, black ones indicate the location of objects, and white ones tell you where to find other people. Doors leading into the maze are also shown, and you can tell whether they are open or closed.

At the bottom of the screen the parser occupies two small windows. The left one holds a list of verbs; the other, nouns. Type the first letter of a word, and the list hops to the first word beginning with that letter. For example, type T and the word take is highlighted. Then hit the cursor key to activate the noun window and follow the same process to find the object you want to grab. (If there is only one item in sight, you can just hit RETURN or the joystick button to take it.) It's basically a kiddie parser with a limited vocabulary—but at least you can scroll through the windows to see all the words. The game's text responses are usually shown in a colored bubble at the top of the screen, a technique also employed in *Habitat*.

Inside the maze, graffiti is scrawled on the walls. This marks secret doors that lead deeper into the labyrinth. Dedicated adventurers will get to visit some of the imaginary worlds created by Henson, places like the Wise Man's Garden and the Hall of Stone Faces. Muppet characters—Hoggle, Sir Dydymus and the Fireys—are stationed within the maze and may help if you speak to them. The parser doesn't let you do more than say "Speak Hoggle," so character interaction is constrained. But most problems involve object manipulation, and you'll find many objects lying in plain view in the hall. And vending machines often sell useful items.

You can't just stroll along scarfing up crystal balls and other valuables, for danger lurks inside the labyrinth. When you hear the sounds of a man in armor clanking down the hall, head for the nearest door. Otherwise he'll open a trap door that drops you into a pit. You can buy your way out or use a magic word. Unfortunately a magic word costs you an hour of time.

Either way, you'll start at the beginning of the maze (not the text game). Your position is automatically saved, and when you reload the program, you just choose the game with your name beside it. Three different games in progress may be saved to the program disk.

The sound effects are impressive, especially that eerie harpsichord music that accompanies the Goblin's initial manifestation. Graphics and animation are smooth and refined, and some full-screen illustrations—like that of the Goblin—feature superb high-resolution computer art. You won't see any of the fractal graphics that dominated the first Lucasfilm games. With its simple parser and joystick interface, the game is aimed at adventurers 13 and under. You don't have to be a Muppet fan to enjoy *Labyrinth*, but it helps.

I'll Take Manhattan

Amnesia is an all-text game that spares the reader/player from map-making with an even more direct method—the documentation includes a street map of Manhattan where the game takes place. That is practically a necessity, for *Amnesia* contains 4,000 locations and 650 streets! Mapping this on your own could take years, and you would have to rent a warehouse to store all the maps. You also get a map of the subway routes, so you won't get lost in New York's *real* mazes.

Doing away with the need for mapping gives you more time to appreciate the prose of author Thomas A. Disch—and concentrate on solving the mystery he has devised. Disch is a novelist whose science fiction and mysteries have won many awards, but this is not an adaptation of an existing work. Though *Amnesia* contains enough text to fill a small novel, he wrote it specifically as a text adventure.

The story begins when you awake in a hotel room in New York, without clothes or a memory. Before going anywhere, you've got to find something to wear. Then you can set out to discover your identity and how you lost it.

The people you meet may help jog your memory. There's a redneck Texan who calls you John Cameron and wants you to marry his daughter. A bag lady across town has a note you wrote to yourself—a note she says you told her to hold for you in case something like this happened. Then there's a bell clerk who calls you Xavier Hollings, whom it turns

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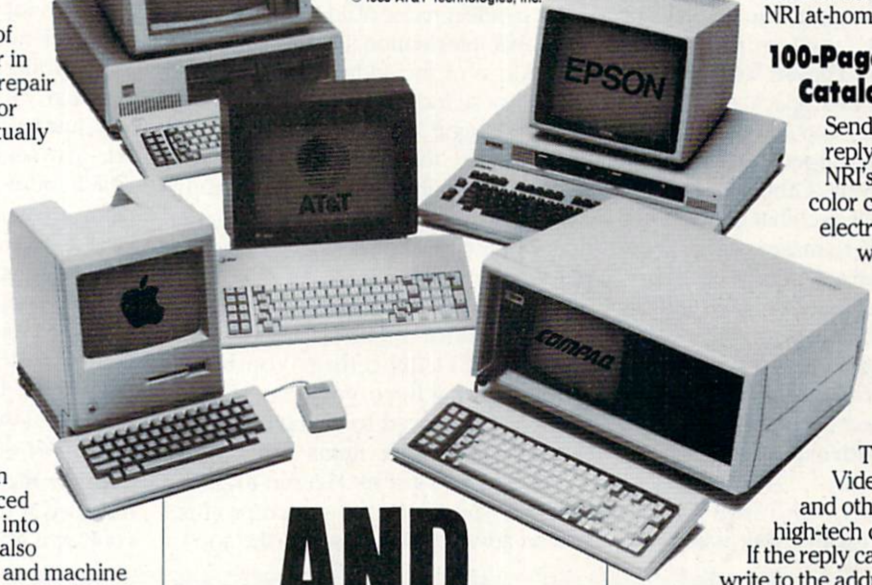
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We'll Give You Tomorrow.

BY KENNY LAWSON

Letter Right!

for the Commodore 64



Here is a simple word processor that lets you create a letter you can be proud of.

So, you just got your first Commodore 64 and a printer—and you're wondering what you can do with them. Well, Letter Right! is just the program for you! It is no top-of-the-line word processor, but it does a good job helping you write personal or business letters right away.

The program opens with a menu with eight selections. The first choice (A) selects letter case—upper-case/graphics or upper-/lower-case (used for most correspondence). Next choose whether you wish single- or double-spacing (B).

If you choose to skip choices A and B, they will default to upper-case and single spacing, respectively. Otherwise, selecting lower-case will also change the letter case on the screen to make it easier to remember to capitalize letters as necessary.

Now enter your name (C) and address (D). If you are the only person who is going to use the program, it is easy to customize. Just change line 510 to NM$="Your name", change line 540 to AD$="Your address", line 560 to CY$="Your city", line 580 to SA$="Your state" and line 600 to ZP$="Your zip code". Now when you choose C and D, no entry will be necessary, although you must still choose C and D to declare the variables.

Next, select name of addressee (E) and enter that information. Do the same with the address of the addressee (F). And finally, choose today's date (G).

Letter Right! will accept almost any form of entry for the date, because line 260 puts a double-quote in front of the date input, allowing you to use punctuation when entering the date (for example, Jan. 15, 1987).

Now you're ready to write. Here is your last chance to correct any mistakes. Pressing RETURN returns you to the main menu where you can make a change. If you need to change only one selection, the other items will be preserved and you just hit H again to print.

When you hit H, the screen prompts you to advance the paper to the top of the form. This means to set the top of the sheet of paper even with the top of the print head. When you hit the spacebar, the printer automatically advances ten lines and prints your address, city, state, zip code and date on the right-hand side, then moves down to print the receiver's name and address on the left. The program then prints the salutation line and moves down to the start of the text.

As was mentioned earlier, this is not a top-of-the-line word processor. For instance, you must press the spacebar five times to indent a new paragraph. A screen prompt warns you not to type in more than two screen lines of text before pressing RETURN because of the 64's 80-character logical line limit. Any text over two lines long will be cut off, and all the text over two lines long will not be sent to the printer. So, be careful here!

When you are finished entering your text, just press RETURN on a blank input line. This sends the program to line 1150, which prints the "Sincerely," and your name, then ends the program. There you have it—a letter you can be proud of!

This program was written for a Commodore-compatible printer. If your printer doesn't recognize Commodore printer control codes, check your printer user's manual for the proper codes to use in line 390 (the variable SP) to set your printer for double-spacing.

Letter Right! uses only 4,010 bytes of memory. It can easily be customized for your own applications. ■

Before typing these programs, read "How to Enter Programs," and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

Letter Right!

```
30 REM ***    LETTER RIGHT!    ***'BSYD
60 SP=0:PRINT"[CLEAR]":GOSUB 1210
   :LC=0:G=0'FQHJ
70 CLOSE 4'BBLD
80 PRINT"[CLEAR]"'BATF
90 :'ABHF
100 REM *** MAIN MENU ***'BODX
110 :'ABHV
120 GOSUB 280:POKE 646,15'CKQA
130 PRINT"[HOME,DOWN3,RIGHT,SPACE14,
    RVS]MAIN MENU":PRINT:PRINT'DCUE
140 PRINT"[RIGHT2,RVS]A[RVOFF].
    [SPACE2]SELECT LETTER CASE"
    :PRINT'CBWG
150 PRINT"[RIGHT2,RVS]B[RVOFF].
    [SPACE2]SELECT SPACING":PRINT'CBNG
160 PRINT"[RIGHT2,RVS]C[RVOFF].
    [SPACE2]SELECT NAME OF SENDER"
    :PRINT'CBQJ
170 PRINT"[RIGHT2,RVS]D[RVOFF].
    [SPACE2]SELECT ADDRESS OF SENDER"
    :PRINT'CBSL
180 PRINT"[RIGHT2,RVS]E[RVOFF].
    [SPACE2]SELECT NAME OF ADDRESSEE"
    :PRINT'CBWM
190 PRINT"[RIGHT2,RVS]F[RVOFF].
    [SPACE2]SELECT ADDRESS OF
    ADDRESSEE":PRINT'CBYO
200 PRINT"[RIGHT2,RVS]G[RVOFF].
    [SPACE2]SELECT TODAY'S DATE"
    :PRINT'CBSE
210 PRINT"[RIGHT2,RVS]H[RVOFF].
    [SPACE2]BEGIN LETTER"'BASC
220 PRINT:PRINT"[RIGHT2,SPACE7,RVS]
    CHOOSE LETTER OF CHOICE"'CBUG
230 GET A$:IF A$=""THEN 230'EIED
240 A=ASC(A$)-64:IF A<1 OR A>8 THEN
    230'IPGI
250 ON A GOTO 360,430,500,530,620,650,
    700,760'CHHI
260 POKE 198,0:POKE 631,34:POKE 198,1
```

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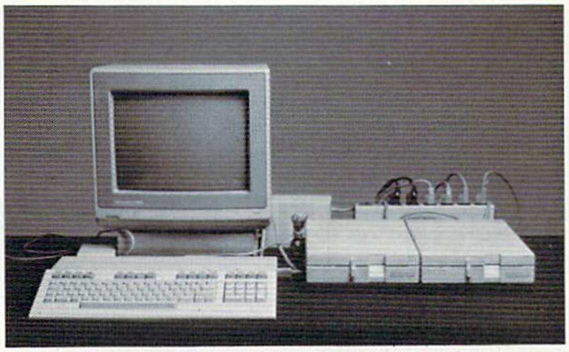
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Continued from pg. 82

```
    :RETURN:REM  QUOTE MARKS'FFAM
270 :'ABHD
280 PRINT"[CLEAR]": REM *** BORDER
    LINE ***'CRPJ
290 :'ABHF
300 POKE 53281,9:POKE 53280,9
    :POKE 646,0'DVED
310 FOR X=1024 TO 1063:POKE X,102:NEXT
    :FOR X=55296 TO 55335:POKE X,0
    :NEXT'KIEL
320 FOR X=1103 TO 2023 STEP 40
    :POKE X,102:NEXT'GSHG
325 FOR X=55375 TO 56295 STEP 40
    :POKE X,0:NEXT'GSTL
330 FOR X=2023 TO 1984 STEP-1
    :POKE X,102:NEXT'HRTH
335 FOR X=56295 TO 56256 STEP-1
    :POKE X,0:NEXT'HRIN
340 FOR X=1984 TO 1024 STEP-40
    :POKE X,102:NEXT'HSOJ
345 FOR X=56216 TO 55336 STEP-40
    :POKE X,0:NEXT'HSYO
350 RETURN'BAQC
360 GOSUB 730'BDNE
370 PRINT"[DOWN3,RVS]U[RVOFF]PPER OR
    [RVS]L[RVOFF]OWER CASE"'BAML
380 GOSUB 740 'BDOG
390 IF A$="L"THEN SP=7:PRINT CHR$(14)
    :GOTO 80'HNGN
400 SP=0'BDHY
410 IF A$<>"U"THEN 380'EFKC
420 GOTO 80'BCPA
430 GOSUB 730'BDNC
440 PRINT"[RVS]S[RVOFF]INGLE OR [RVS]
    D[RVOFF]OUBLE[SPACE2]SPACING"'BAEK
450 GOSUB 740'BDOE
460 IF A$="D"THEN G=1:GOTO 80'FHBI
470 G=0'BCPG
480 IF A$<>"S"THEN 450'EFGJ
490 GOTO 80'BCPH
500 GOSUB 730'BDNA
510 INPUT "YOUR NAME";NM$'BEXE
520 GOTO 80'BCPB
530 GOSUB 730'BDND
540 INPUT"YOUR ADDRESS";AD$'BEHH
550 PRINT'BACE
560 INPUT "YOUR CITY";CY$'BEWJ
570 PRINT'BACG
580 INPUT "YOUR STATE";SA$'BEML
590 PRINT'BACI
600 INPUT "YOUR ZIP CODE";ZP$'BEDF
610 GOTO 80'BCPB
620 GOSUB 730'BDND
630 INPUT "NAME OF ADDRESSEE";NA$'BEIJ
640 GOTO 80'BCPE
650 GOSUB 730:INPUT "STREET ADDRESS";
    AA$'CIIL
660 PRINT:INPUT"CITY";AC$'CFTJ
670 PRINT:INPUT"STATE";AS$'CFIK
680 PRINT:INPUT "ZIPCODE";AZ$'CFCM
690 GOTO 80'BCPJ
700 GOSUB 730'BDNC
710 PRINT"TODAY'S DATE";:GOSUB 260;
    :INPUT DT$'DKTJ
720 GOTO 80'BCPD
730 PRINT"[CLEAR,DOWN8]";:RETURN'CCIG
740 GET A$:IF A$=""THEN 740'EIKJ
750 RETURN'BAQG
760 :'ABHH
770 REM *** WRITE ROUTINE ***'BSJN
780 :'ABHJ
790 G=0'BCPL
800 PRINT"[CLEAR]"'BATD
810 PRINT"[RVS,SPACE5]POSITION PAPER
    TO TOP OF SHEET[SPACE5]"'BACN
820 PRINT"[DOWN17,RIGHT,RVS]
    PRESS (SPACE) TO CONTINUE OR
    'RETURN'"'BABP
822 PRINT:PRINT"[RIGHT5,RVS]
    ALONE TO RETURN TO MAIN
    MENU."'CBCP
824 GET A$:IF A$=""THEN 830'EIKM
826 IF A$=CHR$(13)THEN 80'EITO
828 IF A$=" "THEN 840'DFFP
830 GOTO 824'BDNG
840 PRINT"[CLEAR]BE SURE NOT TO ENTER
    MORE THAN TWO"'BAMQ
850 PRINT"SCREEN LINES BEFORE HITTING
    [RVS]RETURN[RVOFF],"'BAMR
860 PRINT"OR THE EXTRA WORDS WILL BE
    DROPPED."'BAGS
870 PRINT"PRESS [RVS]RETURN[RVOFF]
    WITHOUT ANY INPUT TO END."'BAWU
880 PRINT"BEGIN LETTER WHEN THE
    CURSOR REAPPEARS.":PRINT'CBLW
890 OPEN 4,4,SP'BGCN
900 FOR T=1 TO 10:PRINT#4:NEXT
    :LC=LC+10'HOWK
910 ZA$=CY$+","+SA$+" "+ZP$'FMVK
920 PRINT#4,SPC(40)AD$:LC=LC+1'EOJK
930 IF G=1 THEN PRINT#4:LC=LC+1'GJNM
940 PRINT#4,SPC(40)ZA$:LC=LC+1'EOGM
950 IF G=1 THEN PRINT#4:LC=LC+1'GJNO
960 PRINT#4,SPC(40)DT$:LC=LC+1'EODO
970 FOR T=1 TO 4:PRINT#4:NEXT
    :LC=LC+1'HMER
980 ZB$=AC$+","+AS$+" "+AZ$'FMIR
990 PRINT#4,NA$:LC=LC+1'DLSQ
1000 IF G=1 THEN PRINT#4:LC=LC+1'GJNY
1010 PRINT#4,AA$:LC=LC+1'DLFX
1020 IF G=1 THEN PRINT#4:LC=LC+1'GJNB
1030 PRINT#4,ZB$:LC=LC+1'DLGA
1040 FOR T=1 TO 3:PRINT#4:NEXT
     :LC=LC+3'HMFE
1050 IF SP=7 THEN PRINT#4,"[SHFT D]
     EAR "NA$+",":LC=LC+1
     :GOTO 1070'ITLJ
1060 PRINT#4,"DEAR "NA$+","
     :LC=LC+1'ELQF
1070 FOR T=1 TO 3:PRINT#4:NEXT
     :LC=LC+4'HMGH
1080 GOSUB 260'BDLC
1090 A$="":INPUT A$'CFIE
1100 IF A$=""THEN 1150 'DGQW
```

Continued on pg. 86

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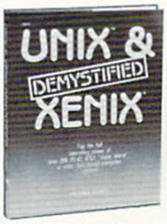
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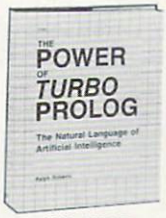
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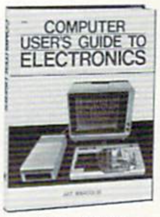
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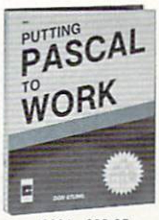
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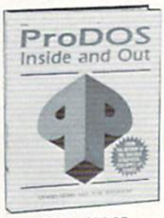
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Continued from pg. 84

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1110 PRINT#4,A$:LC=LC+1'DKPY
1120 IF G=1 THEN PRINT#4:LC=LC+1'GJNC
1130 IF LC=>56 THEN FOR X=1 TO 18
     :PRINT#4:NEXT:LC=8'KPEG
1140 GOTO 1080'BEGY
1150 PRINT#4:PRINT#4:PRINT#4'DFPB
1160 IF SP=7 THEN PRINT#4,TAB(45)"
     [SHFT S]INCERELY,":GOTO 1180'GNTJ
1170 PRINT#4,TAB(45)"SINCERELY,"'CFRG
1180 PRINT#4:PRINT#4,TAB(45)NM$'DKQF
1190 CLOSE 4'BBLD
1200 END'BACU
1210 :'ABHV
1230 REM *** TITLE PAGE ***'BPQC
1240 :'ABHY
1260 POKE 53280,0:POKE 53281,0
     :POKE 646,7'DVXG
1270 PRINT"[SPACE2,RVS,SPACE2,RVOFF,
     SPACE4,RVS,SPACE4,RVOFF,SPACE2,
     RVS,SPACE4,RVOFF,SPACE2,RVS,
     SPACE4,RVOFF,SPACE2,RVS,SPACE4,
     RVOFF,SPACE2,RVS,SPACE3,CMDR *]
     "'BAKL
1280 PRINT"[SPACE2,RVS,SPACE2,RVOFF,
     SPACE4,RVS,SPACE4,RVOFF,SPACE2,
     RVS,SPACE4,RVOFF,SPACE2,RVS,
     SPACE4,RVOFF,SPACE2,RVS,SPACE4,
     RVOFF,SPACE2,RVS,SPACE4,CMDR *]
     "'BARM
1290 PRINT"[SPACE2,RVS,SPACE2,RVOFF,
     SPACE4,RVS,SPACE2,RVOFF,SPACE5,
     RVS,SPACE2,RVOFF,SPACE4,RVS,
     SPACE2,RVOFF,SPACE3,RVS,SPACE2,
     RVOFF,SPACE4,RVS] [RVOFF,SPACE2,
     RVS,SPACE2]"'BAPN
1300 PRINT"[SPACE2,RVS,SPACE2,RVOFF,
     SPACE4,RVS,SPACE3,RVOFF,SPACE4,
     RVS,SPACE2,RVOFF,SPACE4,RVS,
     SPACE2,RVOFF,SPACE3,RVS,SPACE3,
     RVOFF,SPACE3,RVS,SPACE4,RVOFF,
     SHFT POUND]"'BAKF
1310 PRINT"[SPACE2,RVS,SPACE2,RVOFF,
     SPACE4,RVS,SPACE3,RVOFF,SPACE4,
     RVS,SPACE2,RVOFF,SPACE4,RVS,
     SPACE2,RVOFF,SPACE3,RVS,SPACE3,
     RVOFF,SPACE3,RVS,SPACE4,CMDR *]
     "'BARG
1320 PRINT"[SPACE2,RVS,SPACE2,RVOFF,
     SPACE4,RVS,SPACE2,RVOFF,SPACE5,
     RVS,SPACE2,RVOFF,SPACE4,RVS,
     SPACE2,RVOFF,SPACE3,RVS,SPACE2,
     RVOFF,SPACE4,RVS,SPACE2,RVOFF,
     CMDR *,RVS,SPACE2,CMDR *]"'BAAI
1330 PRINT"[SPACE2,RVS,SPACE4,RVOFF,
     SPACE2,RVS,SPACE4,RVOFF,SPACE3,
     RVS,SPACE2,RVOFF,SPACE4,RVS,
     SPACE2,RVOFF,SPACE3,RVS,SPACE4,
     RVOFF,SPACE2,RVS,SPACE2,RVOFF]
     [CMDR *,RVS,SPACE2]"'BAJJ
1340 PRINT"[SPACE2,RVS,SPACE4,RVOFF,
     SPACE2,RVS,SPACE4,RVOFF,SPACE3,
     RVS,SPACE2,RVOFF,SPACE4,RVS,
     SPACE2,RVOFF,SPACE3,RVS,SPACE4,
     RVOFF,SPACE2,RVS,SPACE2,RVOFF,
     SPACE2,CMDR *,RVS] "'BAJK
1350 PRINT"[DOWN4,RIGHT3,RVS,SPACE3,
     CMDR *,RVOFF,SPACE4,RVS,SPACE2,
     RVOFF,SPACE3,RVS,SHFT POUND,
     SPACE2,CMDR *,RVOFF,SPACE3,RVS,
     SPACE2,RVOFF] [RVS,SPACE2,RVOFF,
     SPACE2,RVS,SPACE4,RVOFF,SPACE2,
     RVS] [RVOFF]"'BABN
1360 PRINT"[SPACE3,RVS,SPACE4,CMDR *,
     RVOFF,SPACE3,RVS,SPACE2,RVOFF,
     SPACE2,RVS,SHFT POUND] [RVOFF,
     SHFT POUND,CMDR *,RVS] [CMDR *,
     RVOFF,SPACE2,RVS,SPACE2,RVOFF]
     [RVS,SPACE2,RVOFF,SPACE3,RVS,
     SPACE2,RVOFF,SPACE3,RVS] [RVOFF]
     "'BAFP
1370 PRINT"[SPACE3,RVS] [RVOFF,SPACE2,
     RVS,SPACE2,RVOFF,SPACE3,RVS,
     SPACE2,RVOFF,SPACE2,RVS,SPACE2,
     RVOFF,SPACE2,RVS,SPACE2,RVOFF,
     SPACE2,RVS,SPACE5,RVOFF,SPACE3,
     RVS,SPACE2,RVOFF,SPACE3,RVS]
     [RVOFF]"'BAVN
1380 PRINT"[SPACE3,RVS,SPACE4,RVOFF,
     SHFT POUND,SPACE3,RVS,SPACE2,
     RVOFF,SPACE2,RVS,SPACE2,RVOFF,
     SPACE2,RVS,SPACE2,RVOFF,SPACE2,
     RVS,SPACE5,RVOFF,SPACE3,RVS,
     SPACE2,RVOFF,SPACE3,RVS] [RVOFF]
     "'BATO
1390 PRINT"[SPACE3,RVS,SPACE4,CMDR *,
     RVOFF,SPACE3,RVS,SPACE2,RVOFF,
     SPACE2,RVS,SPACE2,CMDR *,RVOFF,
     SPACE5,RVS,SPACE5,RVOFF,SPACE3,
     RVS,SPACE2,RVOFF,SPACE3,RVS]
     [RVOFF]"'BAAP
1400 PRINT"[SPACE3,RVS,SPACE2,RVOFF,
     CMDR *,RVS,SPACE2,CMDR *,RVOFF,
     SPACE2,RVS,SPACE2,RVOFF,SPACE2,
     RVS,SPACE6,RVOFF,SPACE2,RVS,
     SPACE2,RVOFF] [RVS,SPACE2,RVOFF,
     SPACE3,RVS,SPACE2,RVOFF,SPACE3,
     RVS] [RVOFF]"'BAYI
1410 PRINT"[SPACE3,RVS,SPACE2,RVOFF]
     [CMDR *,RVS,SPACE2,RVOFF,SPACE2,
     RVS,SPACE2,RVOFF,SPACE2,CMDR *,
     RVS] [RVOFF,SPACE2,RVS,SPACE2,
     RVOFF,SPACE2,RVS,SPACE2,RVOFF]
     [RVS,SPACE2,RVOFF,SPACE3,RVS,
     SPACE2,RVOFF,SPACE2]"'BAKJ
1420 PRINT"[SPACE3,RVS,SPACE2,RVOFF,
     SPACE2,CMDR *,RVS] [RVOFF,SPACE2,
     RVS,SPACE2,RVOFF,SPACE3,CMDR *,
     RVS,SPACE2,RVOFF,SHFT POUND,RVS]
     [RVOFF,SPACE2,RVS,SPACE2,RVOFF]
     [RVS,SPACE2,RVOFF,SPACE3,RVS,
     SPACE2,RVOFF,SPACE3,SHFT Q]"'BADM
1430 PRINT"[DOWN,SPACE5,RVS]
     V2.5 1986 BY KENNY LAWSON "'BAGH
1440 FOR T=1 TO 3500:NEXT'EHXE
1450 RETURN'BAQC
```

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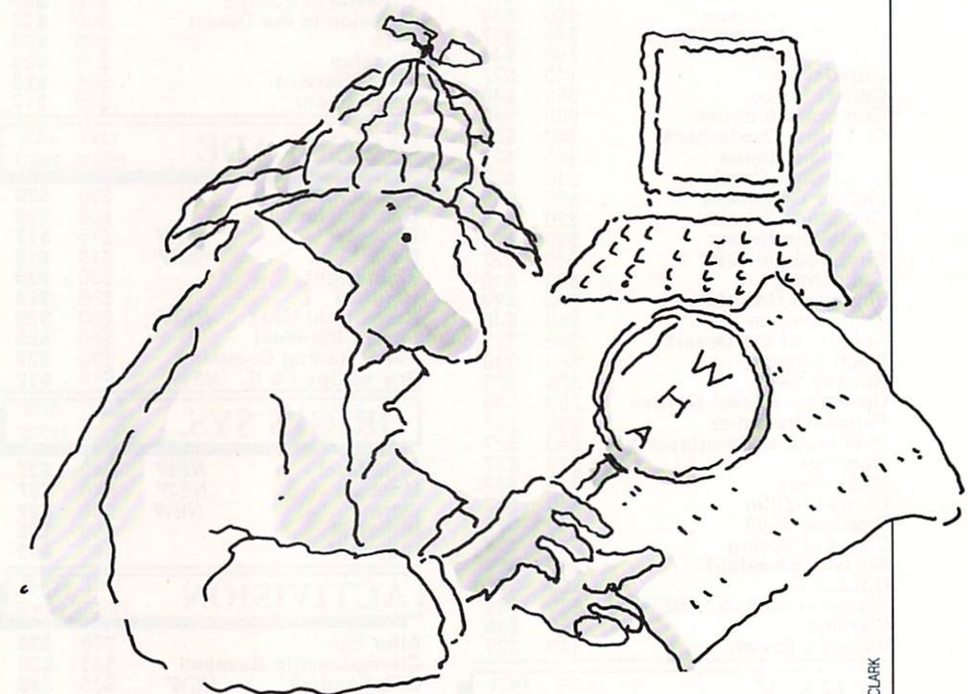
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All software is for the C-64/128.
All software is disk only.
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BY IAN ADAM

Addition Master

for the Commodore 64



Team up with your computer to solve word addition puzzles.

This program solves alphametic puzzles, puzzles in which letters symbolize numbers in a standard addition configuration. Since each letter replaces one digit, the solution essentially becomes a code-breaking exercise. You have to deduce the message from the coded data.

The real challenge of these kinds of puzzles is time. There are up to ten digits represented and there may be up to ten factorial potential solutions (that is, 10 * 9 * 8 * 7 * 6 * 5 * 4 * 3 * 2 * 1, or 3,628,800 solutions). This is clearly too many solutions to try in any reasonable amount of time. Regardless of whether you attempt it manually or by computer, there has to be a way to simplify the problem.

Traditionally, human intellect has solved the puzzle by deduction. Using various clues, you can eliminate various combinations of digits, and with a reasonable puzzle, make steady progress toward the solution. Eventually, when you run out of ideas, the 3.6 million solutions should be reduced to a more manageable sum...say a dozen or two. It then becomes a matter of brute strength to try the remaining combinations and find the one that works. You may want to try this method on the sample puzzles yourself before feeding them into the computer. If you do, compare your time with the computer to see who does best.

My bet is that you will soon find the human solution to be very time-consuming—and somewhat unreliable. However, the computer alone would also have considerable difficulty with 3.6 million combinations. In BASIC, it could take a couple of weeks simply to generate all the solutions, let alone test them.

The program has been designed with teamwork in mind—to allow your intellect to work with the computer. As quarterback, you call the play: entering the puzzle and supplying as many clues as you can find. Your 64 then runs with the ball, using its raw number capabilities to find the solution.

Your Part

The first step involves some brute strength on your part—you have to type in the program. In spite of its length, you must type carefully, for a small typo could be critical. If you find it's too long, you can substitute 2020 GOTO 500 and leave out everything after that. Then with a copy securely saved, run the program and choose "addition" from the menu. If you're using a printer, enter the date. You then must indicate the total number of lines in the puzzle, including the sum line, and enter each one individually.

Now for the deduction: By analyzing the puzzle or using intuition, you have to supply some clues. Often the puzzle will have a clue supplied with it; just enter this directly. For example, if you determine that a certain letter must be even, you can cut the number of combinations by half. If you can specify the exact value of a letter, the amount of computation will be reduced by 90%!

Sometimes the structure will be a giveaway. Take a look at the first sample puzzle about the guitar. You should be able to deduce that the letter G must be 1, because G + S cannot possibly add up to 20. By a similar process, the value of U can be determined and entered as a clue.

Computer's Part

Because of the complexity of the process, the program does a lot of error checking at the beginning. The solution does take time, and it would be a shame to waste it on a wild goose chase, a puzzle that is impossible, or a puzzle that has been entered wrong. All in all, the error checking accounts for about 1/4 of the program's length.

Once it gets rolling, the program simply generates the remaining combinations of digits and tests them. The rather cryptic subroutine beginning at line 252 is responsible for generating the digits, returning them in the array I(I). The section from line 5 to about 200 tests these digits in the puzzle; this is done one column at a time to eliminate unsuccessful combinations as quickly as possible.

Without going into too much detail,

here are some of the key array variables and sections.

IN$( )	Holds the various letters
SO( )	Holds the clues
TR( )	Holds the value currently being tried
CO(r,c)	Points to the letter held in row r column c, measured from the upper right
Lines 265-365	Check clues
Lines 370-445	Display puzzle and solution
Lines 500-850	Input and organize puzzle
Lines 1000-on	Gather clues

There are a few more programming tricks that you might find interesting. After each puzzle has been solved, a simple CLR quickly sweeps up the leftover variables, loops and subroutines. Then, DIM is used to re-establish arrays. An unusual step is the further use of DIM to define non-array variables in the proper order. This allows the most frequently-used variables to be retrieved the fastest. Similarly, small line numbers are used for fast retrieval of frequently-used parts of the program.

The subroutine at line 465 serves multiple purposes, depending on where it is entered. GOSUB 475 will produce a beep; GOSUB 470 waits for a keypress, then beeps. GOSUB 465 beeps, waits, then beeps again. Note too that the subroutine calls itself from line 465, which makes it recursive. The unusual structure in lines 1160 to 1210 is a series of nested ON statements used to resolve a matrix of clue combinations.

Extensions

As long as algorithms had to be included to check for primes and squares, I added separate menu items to access these directly. They can be handy if, like me, you are fascinated by experimenting with numbers and their properties.

The program could be readily transported to other computers. The main changes would be to screen formatting, printer access, and a few memory locations for sound and screen color.

Whatever your computer, I hope that you find this program interesting, and that it illustrates how your intellect and your computer can complement one another to efficiently work together.

Sample Puzzles

Easy:

```
 GREAT
 START
    AT
     A
  ----
GUITAR
```

```
 TOO
 TOO
 TOO
 TOO
 HOT   Clue:
  TO   TROT
----   is not
TROT   prime
```

```
  WAS
 THAT  Clue:
  ALL  WAS
 ----  is a
RIGHT  square
```

```
 WHAT
    A  Clue:
GREAT  WASTE
 ----  is
WASTE  even
```

```
TELL
SOME
TALL
----
TALES
```

```
 FIND  Clue:
   ME  GRIND
 FINE  is a
 ----  square
GRIND
```

```
 TELL  Clue:
  THE  TELL
WHOLE  is a
 ----  prime
TRUTH  number
```

```
 BUT  Clue:
LOOK  it's a
   A  prime
----  BUTT
BUTT
```

Moderate to Hard:

```
  HAVE
     A
 DRINK (very
  DEAR hard)
 FIRED
  ----
FRIEND
```

```
DALAI
  SAW  Clue:
    A  DALAI
 WILD  is
 ----  even
LLAMA
```

```
   SO  Clue:
  THE  Moon-
 MOON  Shine
 DOES  is
 ----  even
SHINE
```

```
 RIDE  Clue:
 WIDE  SLIDE
 WILD  is a
  WET  square
 ----  number
SLIDE
```

```
 BOSS
   AT  Clue:
 FOOT  the BOSS
 BALL  is even-
 ----  minded
FALLS
```

```
  ITS
   SO  Clue:
TASTY  TOAST
   TO  has a
 ----  prime
TOAST  taste
```

Before typing these programs, read "How to Enter Programs," and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

Addition Master

```
1 LN$="----------"'BDJC
2 GOTO 2000'BEYB
5 C=MA:IF SX(C)THEN U(TR(CO(R,
   C)))=.'EYDL
10 IF N THEN 35'CDGX
15 F=.:C=C-1:IF C=.THEN RETURN'HJTI
20 IF SX(C)THEN U(TR(CO(R,C)))=.'DUUE
25 N=ND(C):IF N=.THEN 15'ELMI
30 FOR I=1 TO N:L(I)=TR(DI(C,I))
   :NEXT'FUKG
35 GOSUB 258:IF F THEN 15'DHRH
40 FOR I=1 TO N:TJ=L(I):SJ=SO(DI(C,I))
   :GOSUB 270:IF A1=.THEN 35'JJQN
45 TR(DI(C,I))=TJ:NEXT'COCJ
50 TJ=CA(C-1):FOR I=1 TO R-1
   :IF C>LEN(RW$(I))THEN 65'KAQN
55 IF RP(C)=I THEN 65'DIFJ
60 TJ=TJ+TR(CO(I,C))'CPQH
65 NEXT:CA(C)=INT(TJ/10)
   :TJ=TJ-10*CA(C):IF RP(C)THEN IF TJ
   THEN 10'LJDW
70 IF RP(C)THEN 105'CIDF
75 A=CO(R,C):IF A THEN IF SX(C)THEN
   90'FREP
80 IF TJ=TR(A)THEN 105'DKEI
85 GOTO 10'BCIJ
90 IF U(TJ)THEN 10'CHOH
95 SJ=SO(A):GOSUB 270:IF A1=.THEN
   10'FRCR
100 TR(A)=TJ:U(TJ)=1'COHY
105 C=C+1:IF C>MA THEN 120'FKWF
110 A1=.:N=ND(C):IF N=.THEN 50'FPBC
115 GOSUB 252:GOTO 40'CGBD
120 TJ=CA(MA):IF TJ=.THEN ON LR-MA+1
    GOTO 155,5'IWAH
125 IF LR=MA THEN 5'DFSF
130 A=CO(R,LR):IF SX(C)=.THEN 150'ETTF
135 IF U(TJ)THEN 5'CGUF
140 SJ=SO(A):GOSUB 270:IF A1=.THEN
```

```
    5'FQNF
145 TR(A)=TJ:U(TJ)=1:GOTO 155'DSUK
150 IF TR(A)-TJ THEN 5'DIGD
155 N=ND(12):IF N=.THEN 192'ENXK
160 GOSUB 252:GOTO 185'CHJD
165 IF N=.THEN 175'DFCI
170 GOSUB 258:IF F=.THEN 185'EJQG
175 IF SX(LR)THEN U(TR(CO(R,
    LR)))=.'DWVO
180 C=MA:F=.:GOTO 20'DJIH
185 FOR I=1 TO N:TJ=L(I)
    :SJ=SO(DI(12,I)):GOSUB 270
    :IF A1=.THEN 170'JLVV
190 TR(DI(12,I))=TJ:NEXT'CPJI
192 FOR I=1 TO R:IF TR(CO(I,
    LEN(RW$(I))))=.THEN 165'HBJQ
195 IF CL(I)=0 THEN 230'DJJM
200 A=0:FOR A1=LEN(RW$(I))TO 1 STEP-1
    :A=10*A+TR(CO(I,A1)):NEXT'LIUK
202 IF CL(I)>2 THEN 215'DJNB
205 GOSUB 350:IF CL(I)+(A1>0)=1 THEN
    230'GSCI
210 GOTO 165'BDLX
215 IF CL(I)>4 THEN 230'DJMF
220 B=INT(SQR(A)*A2):A1=3
    :IF A=B*B THEN A1=4'KTUI
225 IF CL(I)=A1 THEN 165'DKBH
230 NEXT I:B$=TI$:S=S+1
    :IF S=1 THEN GOSUB 475:GOTO 235
    :REM SOLUTION'KFNM
232 PRINT"... NEXT SOLUTION READY";
    'BBDI
233 IF P<4 THEN GOSUB 465'EFXF
235 PRINT"[CLEAR]";:GOSUB 400
    :IF P THEN CMD P:GOSUB 400
    :PRINT#P'HOHL
240 PRINT:PRINT"...BACK TO WORK ";
    'CCXF
245 TI$=B$:GOTO 165'CJFI
250 :'ABHB
251 REM SUBROUTINES'BLQF
252 I=1'BCSE
253 L(I)=-1'CFPG
254 L(I)=L(I)+1:IF U(L(I))THEN IF
    L(I)<9 THEN 254'HAOO
255 IF L(I)=9 THEN IF U(9)THEN
    259'FMEL
256 U(L(I))=1:IF I<N THEN I=I+1
    :GOTO 253'HSKP
257 RETURN'BAQI
258 FOR I=N TO 1 STEP-1:U(L(I))=.
    :IF L(I)<9 THEN 254'JWMT
259 NEXT:F=1:RETURN'DEWM
260 :'ABHC
265 REM CHECK CLUES'BKEK
270 A1=0:ON SJ-9 GOTO 275,275,280,290,
    295,300,305'EJIM
275 A1=SJ+TJ+1 AND 1:RETURN'FJON
280 IF TJ<3 THEN A1=TJ'EHTI
285 RETURN'BAQJ
290 A1=1:RETURN'CEDH
295 A1=ABS(3-ABS(TJ-5))=1:RETURN'HMGR
300 A1=TJ:RETURN'CFMY
305 A1=ABS(2.5-ABS(TJ-5))-.5
    :RETURN'HPWJ
340 :'ABHB
345 REM PRIME TEST'BJAJ
350 IF A<4 THEN A1=0:RETURN'FGRG
355 IF A/2=INT(A/2)THEN A1=2
    :RETURN'IKVO
360 FOR A1=3 TO SQR(A)STEP 2
    :IF A/A1=INT(A/A1)THEN RETURN'MQVO
365 NEXT:A1=0:RETURN'DFPK
370 PRINT"[CLEAR]";:REM DISPLAY
    PUZZLE'CPXK
375 FOR I=1 TO R'DDML
380 IF I=R THEN PRINT SPC(15-LR)LEFT$
    (LN$,LR)'HPEN
385 PRINT SPC(15-LEN(RW$(I)))RW$(I)
    :NEXT:PRINT'GTIR
390 FOR I=0 TO NC:PRINT CS$(I):NEXT
    :PRINT:RETURN'HOTN
395 REM DISPLAY SOLUTION'BPIQ
400 PRINT SPC(11)"SOLUTION NO."S
    :PRINT SPC(9)"==================
    "'EHFK
405 PRINT SPC(9)"TIME SO FAR: "B$
    :PRINT'DFOJ
410 FOR I=1 TO R:A1=LEN(RW$(I))'FOXF
415 IF I=R THEN PRINT SPC(13-LR)LEFT$
    (LN$,LR)SPC(15-LR)LEFT$(LN$,
    LR)'KDIR
420 PRINT SPC(13-A1)RW$(I)SPC(15-A1);
    'FRUG
425 FOR A=A1 TO 1 STEP-1
    :PRINT CHR$(48+TR(CO(I,A)));
    :NEXT'JXYP
430 PRINT:NEXT:PRINT'DCOD
435 FOR I=1 TO NM:PRINT"[SPACE2]
    "IN$(I);:NEXT:PRINT'GOEN
440 PRINT" ";:FOR I=1 TO NM
    :PRINT TR(I);:NEXT:PRINT'HPVJ
445 PRINT:FOR I=1 TO NC:PRINT CS$(I)
    :NEXT'GNBN
450 RETURN'BAQD
455 :'ABHI
460 REM INPUT AND BEEP'BMOI
465 GOSUB 475:REM BEEP'CISM
470 WAIT 198,3:GET A$:PRINT A$;
    :POKE 198,0'ESVL
475 POKE 54296,15:FOR I=1 TO 20:NEXT
    :POKE 54296,0:RETURN'HXSS
490 :'ABHH
495 REM ENTER PUZZLE'BLVP
500 GOSUB 900:GOTO 520'CHCB
510 PRINT:PRINT"I'M NOT PROGRAMMED
    FOR THAT!"'CBPI
520 CLR:DIM I,C,N,TJ,A,A1,SJ,R
    :A2=1+2E-7'FBKK
525 IF PEEK(828)THEN P=4:OPEN P,P'FLSL
530 DIM L(11),U(11),TR(10),DI(12,10),
    RP(11),CA(12),CO(11,11),SO(10),
    RW$(11)'BRUQ
535 DIM SX(20),ND(12),SL(20,10),
    CL(11),CS$(30),SL$(20)'BVLR
```

```
540 GOSUB 475'BDTE
542 PRINT"[GRAY3,DOWN]THERE MUST BE
    BETWEEN 3 AND 11 LINES,
     INCLUDING THE SUM."'BAGU
545 INPUT"HOW MANY LINES (Ø TO QUIT)
    ";R:IF R=Ø THEN RUN'FFWT
550 IF R<3 OR R>11 THEN 51Ø'FIVJ
555 PRINT:PRINT"ENTER EACH LINE
    SEPARATELY:":PRINT'DCLS
560 FOR I=1 TO R'DDMH
565 INPUT RW$(I):IF LEN(RW$(I))>1Ø
    THEN 51Ø'FUWR
570 IF LEN(RW$(I))=Ø THEN 51Ø'EMLL
575 NEXT:PRINT'CBJM
580 CS$(Ø)="NO LEADING ZEROS"'BGTN
585 LR=LEN(RW$(R)):GOSUB 37Ø'DOCR
590 FOR I=1 TO R:B=LEN(RW$(I))
    :IF I=R THEN 61Ø'ITFR
600 IF B=MA THEN A1=A1+1'FILF
605 IF B>MA THEN A1=Ø:MA=B'FKTK
610 FOR N=1 TO B:A$=LEFT$(RIGHT$(RW$
    (I),N),1)'GUOJ
615 IF ASC(A$)<65 THEN A=Ø:IN$(Ø)=A$
    :L(Ø)=1:GOTO 635'ICXQ
620 FOR A=1 TO 1Ø:IF IN$(A)=A$THEN
    635'GQYJ
625 IF IN$(A)=""THEN IN$(A)=A$:NM=A
    :GOTO 635'GWOP
630 NEXT:NM=11'CFGF
635 CO(I,N)=A'BICK
640 NEXT N,I'BDSF
645 IF MA>LR OR LR>MA+1 THEN 51Ø'GMNQ
650 PRINT"[DOWN2]I FOUND"NM"LETTERS
    :[DOWN]":IF NM<2 OR NM>1Ø THEN
    51Ø'GNYQ
655 FOR I=1 TO NM:PRINT" "IN$(I);
    :SO(I)=13:TR(I)=1Ø:NEXT:PRINT'IFXW
660 IF LR=MA THEN 675'DHCJ
665 IF A1=1 THEN SO(A)=12'EKHP
670 IF A1=Ø THEN TR(A)=1:SO(A)=1
    :U(1)=1:L(A)=1:NC=1
    :CS$(1)=IN$(A)+"MUST BE 1"'KUUA
672 IF A1=Ø THEN CS$(1)=IN$(A)+" MUST
    BE 1"'FPKR
675 GOSUB 1ØØØ:REM CLUES'CKVP
680 FOR I=1 TO R:A=CO(I,LEN(RW$(I)))
    :IF SO(A)=13 THEN SO(A)=15'JJOV
685 IF SO(A)=Ø THEN PRINT CS$(Ø)
    :PRINT IN$(A)" CAN'T BE ZERO!"
    :GOTO 51Ø'GXCA
690 NEXT'BAEJ
695 GOSUB 37Ø'BDNP
700 PRINT"[WHITE]PLEASE ALLOW A FEW
    MINUTES.[DOWN]"'BATI
705 PRINT"1[SPACE2]PROCEED"'BAUJ
710 PRINT"2[SPACE2]CANCEL"'BAIE
715 GOSUB 465:IF A$="2"THEN 52Ø'EJUL
720 IF A$<>"1"THEN 695'EFIG
725 TI$="ØØØØØØ":PRINT"[DOWN]
    THINKING...[DOWN]"'CEBO
730 FOR C=1 TO MA:I=Ø:FOR N=1 TO R-1
    :IF C>LEN(RW$(N))THEN 75Ø'MATR
735 A=CO(N,C):IF L(A)OR A=Ø THEN
    75Ø'FSAQ
740 IF RP(C)=Ø THEN IF A=CO(R,
    C)THEN RP(C)=N:GOTO 75Ø'IYRP
745 I=I+1:DI(C,I)=A:L(A)=1'ESUQ
750 NEXT:ND(C)=I:IF L(CO(R,
    C))OR RP(C)THEN 76Ø'FBNP
755 L(CO(R,C))=1:SX(C)=1'CSCQ
760 NEXT:IF LR>MA THEN IF L(CO(R,
    LR))=Ø THEN L(CO(R,LR))=1
    :SX(LR)=1'JMBV
765 I=Ø:FOR C=1 TO MA:A=CO(R,C)
    :IF L(A)THEN 775'HYBV
770 I=I+1:DI(12,I)=A:L(A)=1'ETCO
775 NEXT:ND(12)=I:C=1'DLRR
800 GOSUB 11Ø:REM SOLUTION'CMAG
810 B$=TI$:GOSUB 475:PRINT" TOTAL TIME
    : "B$'DMHK
815 IF P THEN CMD P:PRINT" TOTAL TIME
    : "B$:PRINT#P'FHHQ
820 IF S THEN PRINT"[DOWN]
    NO MORE SOLUTIONS":GOTO 52Ø'EFTM
825 IF P THEN CMD P:GOSUB 375
    :PRINT" SORRY.. NO SOLUTION FOUND"
    :PRINT#P'GJPV
830 GOSUB 375:PRINT"SORRY.. NO
    SOLUTION FOUND":GOTO 52Ø'DIUP
890 :'ABHL
895 REM INSTRUCTIONS'BMRU
900 PRINT"[CLEAR]","ADDITION PUZZLE"
    :PRINT,"+++++++++++++++"
    :PRINT'DEJN
905 PRINT"THIS PROGRAM SOLVES
    ALPHAMETIC ADDITION PUZZLES OF
    THIS TYPE:"'BANA
910 PRINT:PRINT"[SPACE3]WAS"
    :PRINT"[SPACE2]THAT"
    :PRINT"[SPACE3]ALL"'EDRL
912 PRINT" -----":PRINT" RIGHT"'CBVK
915 PRINT:PRINT"EACH LETTER STANDS
    FOR A DIFFERENT DIGIT"'CBSV
920 PRINT"SIMPLY ENTER THE PUZZLE
    WHEN PROMPTED."'BAAQ
925 PRINT"ALLOW SEVERAL MINUTES FOR
    THE SOLUTION."'BAGV
930 PRINT:PRINT"ANY CLUES YOU CAN
    OFFER WILL SPEED THE"'CBDR
935 PRINT"PROCESS.[SPACE2]
    IN THIS EXAMPLE, R MUST BE 1;
    "'BADV
940 PRINT"IT IS GIVEN THAT 'WAS' MUST
    BE SQUARE."'BAFR
950 PRINT"[DOWN]USING A PRINTER?
    Y/N"'BABO
955 GOSUB 465:PRINT"[CLEAR]"'CEVP
960 IF A$<>"Y"THEN POKE 828,Ø
    :RETURN'GICO
965 PRINT:PRINT"ENTER THE DATE (NO
    COMMAS)":INPUT A$'DEFX
970 POKE 828,4:OPEN 4,4'CJGN
975 PRINT#4,CHR$(14)"**ADDITION
    MASTER** "A$'CIKW
```

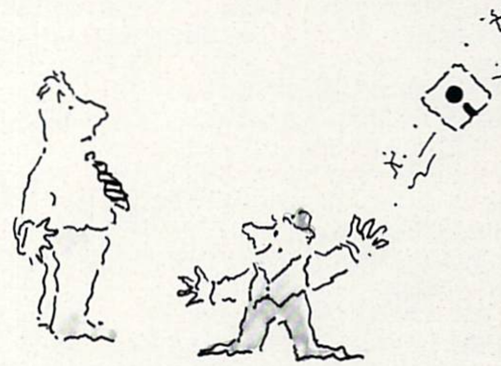
```
980 RETURN'BAQL
990 :'ABHM
995 REM GET CLUES'BIJT
1000 PRINT:PRINT"CAN YOU OFFER ANY
     CLUES? Y/N"'CBUB
1010 CS$(21)="PRIME":CS$(22)="NOT
     PRIME":CS$(23)="SQUARE"'DXWG
1020 CS$(24)="NOT SQUARE"
     :CS$(26)="EVEN":CS$(27)="ODD"
     :CS$(28)="1 OR 2"'EGEK
1030 GOSUB 465:IF A$="N"THEN
     RETURN'FGOA
1040 GOSUB 370:PRINT:PRINT"PRESS THE
     LETTER THE CLUE IS FOR."'DFKI
1050 PRINT"TO SPECIFY A LINE,
      PRESS THE SPACE BAR:"'BAEI
1060 GOSUB 470:IF A$=" "THEN 1350'EKWD
1070 FOR I=1 TO NM:IF IN$(I)=A$THEN
     1100'GRIH
1080 NEXT'BAEB
1090 PRINT A$"???":GOTO 1330'CHVF
1100 PRINT:PRINT"PRESS THE VALUE OF
     THE LETTER '"A$"', OR..."'CDQF
1110 PRINT"A[SPACE2]IF EVEN"
     :PRINT"B[SPACE2]IF ODD"
     :PRINT"C[SPACE2]IF IT COULD BE 1
     OR 2"'DCAH
1120 WAIT 198,3:GET B$:TJ=ASC(B$)
     -48+7*(B$>"9")'IWHG
1130 IF TJ<0 OR TJ>12 THEN 1090'FLWC
1140 SJ=SO(I):IF TJ<10 THEN 1230'EQKE
1150 IF SJ<10 THEN PRINT A$" IS"SJ
     :GOTO 1330'FNWF
1160 ON SJ-9 GOTO 1170,1180,1190,1310,
     1200,1310,1210'DMSJ
1170 ON TJ-9 GOTO 1090,510,1580'DQIG
1180 ON TJ-9 GOTO 510,1090,1570'DQHH
1190 ON TJ-9 GOTO 1590,1570,1090'DROI
1200 ON TJ-9 GOTO 510,1310,1570'DQCA
1210 ON TJ-9 GOTO 1310,1310,1570'DRYB
1230 IF SJ=TJ THEN 1090'DIHB
1240 IF SJ<10 THEN 510'DHUC
1250 GOSUB 270:IF A1=0 THEN 510'EKXE
1260 NC=NC+1:CS$(NC)=IN$(I)+" MUST
     BE"+STR$(TJ)'GXSM
1270 U(TJ)=1:L(I)=1:TR(I)=TJ
     :SO(I)=TJ'EDKL
1280 FOR N=1 TO NM:IF I=N THEN
     1300'GLFJ
1290 IF TJ=SO(N)THEN PRINT
     :PRINT IN$(I)" & "IN$(N)" CAN'T
     BOTH BE"TJ:GOTO 510'GBRR
1300 NEXT:GOTO 1320'CFLX
1310 SO(I)=TJ:NC=NC+1:CS$(NC)=IN$(I)
     +" MUST BE "+CS$(TJ+16)'HLYM
1320 PRINT:PRINT CS$(NC)'CIIB
1330 PRINT"ANY MORE CLUES? Y/N"
     :GOTO 1030'CFJG
1340 :'ABHA
1350 PRINT:INPUT"LINE NUMBER";A
     :IF A<1 OR A>R THEN 1090'HMLL
1360 PRINT:PRINT RW$(A)" - IS IT
     :"'CHIG
1370 PRINT:PRINT"1 PRIME?"
     :PRINT"2 NOT PRIME?"'DCXK
1380 PRINT"3 SQUARE?":PRINT"4 NOT
     SQUARE?"'CBLL
1390 PRINT"5 ODD?":PRINT"6 EVEN?"'CBOJ
1400 PRINT"PRESS A NUMBER."'BAUB
1410 GOSUB 465:B=VAL(A$)
     :IF B=0 OR B>6 THEN 1090'ISIH
1420 I=CO(A,1):NC=NC+1:IF B<5 THEN
     1440'GVUH
1430 CS$(NC)=RW$(A)+" IS "+CS$(32-B)
     :TJ=16-B:A$=IN$(I):GOTO 1140'IQWP
1440 CL(A)=B:CS$(NC)=RW$(A)+" IS
     "+CS$(B+20)'FDJL
1450 IF LEN(RW$(A))<=8 THEN 1460'FNNI
1455 CL(A)=0:PRINT"I CAN'T ENSURE
     THAT":CS$(NC)=CS$(NC)+"??"'EWTU
1460 IF LEN(RW$(A))=1 THEN 1320'ENCI
1470 ON B GOTO 1490,1320,1530,
     1320'CUDJ
1480 :'ABHF
1490 SO=SO(I)+1'CIGJ
1495 ON SO GOTO 505,1320,510,1320,510,
     510,510,1320,510,1320,510,1510,
     1570'CJYX
1500 IF SO(I)=16 THEN 510'DKDC
1510 SO(I)=14:GOTO 1320'CMTC
1520 :'ABHA
1530 ON SO(I)+1 GOTO 1320,1320,510,
     510,1320,1320,1320,510,510,1320,
     1320'DGUN
1540 ON SO(I)-10 GOTO 1320,1570,1550,
     510'DARI
1550 SO(I)=16:GOTO 1320'CMVG
1560 :'ABHE
1570 A=1:GOTO 1590'CHGH
1580 A=2'BCLH
1590 SO(I)=A:TR(I)=A:U(A)=1:L(I)=1
     :NC=NC+1'GGOS
1600 CS$(NC)=IN$(I)+" MUST BE"+STR$(A)
     :GOTO 1280'FVPI
1990 :'ABHL
1995 REM TITLE SCREEN'BLIT
2000 POKE 54273,50:POKE 54278,243
     :POKE 54276,33'DCFB
2010 POKE 53269,0:POKE 53281,0'CPSY
2020 PRINT"[CLEAR,L. RED,RVS,SPACE6]
     * * * ADDITION[SPACE2]
     MASTER * * *[SPACE6,L. BLUE]
     "'BAZG
2030 PRINT:PRINT"BY IAN ADAM"'CBIB
2040 PRINT:PRINT"WOULD YOU LIKE:"'CBJD
2050 PRINT:PRINT"1. ADDITION
     PUZZLE"'CBFF
2060 PRINT"2. PRIME NUMBERS"'BAXE
2070 PRINT"3. SQUARES"'BAUE
2080 PRINT:PRINT"0. END"'CBWE
2090 GOSUB 465'BDSE
2100 ON VAL(A$)GOTO 500,2500,3000'DRMA
2110 END'BACV
2490 :'ABHH
```

Continued on pg. 128

BY PAUL G. MULVANEY, III

ITM
for the Commodore 64

Let your Commodore 64 generate Irish jigs and reels.



LINDA CLARK

So there I was, on the road to Galway to buy a few holograms and maybe a pint (or was it the other way around?) when along comes this wee feller, a real microchip off the ol' sod he was, bein' all dressed in a fine green suit so he looked like Michael Jackson, but with a red bowler set askew on his head, oh, maybe 17 degrees or so.

And this is no lie—he says to meself, he says, "Och! You've seen me now, you big devil, and I'll have to grant you three wishes!"—not that I believed him for a moment, for this is the computer age. Bugs I know of—but the wee folk?

"Tell me," inquires yer servant, "if you'd be a leprechaun . . ."

"Heck yes!" says he, only not so politely, "and don't be wastin' any more wishes—that was your first."

Well, I could see now that caution was the watchword with these elfin folk, so I tries to be cute: "Give me a tune" I say, knowin' full well he hadn't a fiddle or tinwhistle. Surely, that would test him, if he were real or not. Well, fast as a bill after Christmas, he reaches into his waistcoat and pulls out a floppy disk and a listing!

"You didn't even have the daycency to specify the toitle of da tune nor make mention of the sort of dance you'd be doin' for my amusement," the little man cackled, "so I'll have to be given you all of them!"

"Are you tellin' me then that this program will generate all the jigs and reels there are?" And I was hopin' by now the answer to that one wasn't another wish! But he was lost in elfin thought by now and didn't seem to notice.

"At line 10 you pick jigs, which have 8 bars of 6/8 notes, or reels, which have 8 of 8. At line 24, the last note is set into a chord suggested by the 1/2-way to the last note; it can be the same, or a third or a fifth apart, or even an octave. Line 29 just makes bars 5 and 6 repeat bars 1 and 2—a lot of old tunes do this. Lines 32-34 prevent any intervals larger than a fifth—unless you'd be jumpin' octaves on me, lad."

"Not I," I stammered, but he went on.

"Line 37—if it takes 3 or so notes to chord, and you'd be havin' a chord one of every 5 or so times, well most of the notes will start to sound like chord progressions."

"The hills are alive," I ventured.

"Quiet and listen!" he screams, so I did.

"You could progress over the hills and far away if lines 46-49 didn't keep the lid on the pot. Line 19 keeps all these rules from befuddlin' the computer with endless loops. Line 54's the piper, playin' the tune twice through, and 71-85 set the SID, the arrow meanin' 'in the second octave,' with two arrows for the high 'd.' Ho!"

"At 113 you may print the note list—much as the good people of Erin teach their young to play the whistle to this very day, by the names of the notes. Easier for the non-musicians and all that. You can leave off the REMs, or put in whatever you wish."

"Well that's all very nice," says me, "but what I want to know is—WHERE IS THE POT OF GOLD!"

With this he throws the disk skyward, and all I hear is "It's where the disk lands!" Well, I couldn't let it land on the ground, could I? So I dives at it and caught it right enough, but when I turned around, he was gone.

Don't ever take your eyes off a leprechaun. ■

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

ITM

```
2 PRINT"[CLEAR]"'BATB
3 FOR CL=54272 TO 54296:POKE CL,Ø
  :NEXT CL:REM CLEAR SONIC
  ADRESSES'GODO
4 PRINT "[SPACE8]RANDOM TRADITIONAL
  TUNES"'BAVK
5 PRINT"[SPACE6]"'BANE
6 PRINT"[SPACE6]"'BANF
7 PRINT"[SPACE6]"'BANG
8 PRINT"[SPACE13]TYPE PREFERENCE
  :"'BATM
9 PRINT"[SPACE11]JIGS(J) OR
  REELS(R)"'BAIN
1Ø GET I$: IF I$="J"GOTO 14'EHRB
11 IF I$="R"GOTO 13'DEIA
12 GOTO 1Ø'BCIY
13 DIM NT(8,8): S=8:T$="RANDOM REEL#"
   : GOTO 15'EQEJ
14 DIM NT(8,6):S=6:T$="RANDOM
   JIG#"'DNLI
15 Z=Z+1:PRINT"[SHFT *38]"
   :PRINT T$ ;Z'EJDK
16 FOR B=1 TO 8'DDEF
17 FOR N=1 TO S'DDSG
18 REM *********'BJJH
19 KL=Ø:REM PREVENTS ENDLESS LOOP'CXBO
2Ø KL=KL+1:IF KL=25 THEN 16'FMLE
21 NT(B,N)=INT(RND(Ø)*15+1)
   :IF B*N<8*S THEN GOTO 29
   :REM NOTE GENERATOR & LAST'MQWR
22 REM *********'BJJC
23 REM LINES24-26 PUT LAST NOTE IN
   TONIC CHORD'BIKK
```

```
24 IF NT(8,S)=NT(4,S)OR ABS(NT(8,
   S)-NT(4,S))=2 OR ABS(NT(8,S)-NT(4,
   S))=4 THEN 32'LAXU
25 IF ABS(NT(8,S)-NT(4,
   S))=7 THEN 32'FTEK
26 GOTO 20'BCJE
27 REM *********'BJJH
28 REM LINE 29 REPEATS OPENING
   THEME'BAJN
29 NT(5,N)=NT(1,N):NT(6,N)=NT(2,
   N)'CEGP
30 REM *********'BJJB
31 REM LINES 32-34 DISALLOW HUGE
   INTERVALS OTHER THAN OCTAVES'BWFO
32 IF ABS(NT(B,N)-NT(B,
   N-1))=7 THEN 50'GUHJ
33 KL=KL+1:IF KL=25 THEN 16
   :REM ANTILOCK'GVQL
34 IF ABS(NT(B,N)-NT(B,
   N-1))>4 GOTO 20'GUUL
35 REM********************************
   **'BIXJ
36 REM LINES 37-43 CREATE CHORDS 20%
   OF THE TIME'BJUO
37 IF N=S GOTO 50'DEDI
38 IF NT(B,N)=1 GOTO 102'DLGL
39 IF NT(B,N)=15 GOTO 107'DMOM
40 NQ=INT(RND(0)*30+1):ON NQ GOTO 50,
   50,50,50,50,50,50,50,50'HORM
41 ON NQ-9 GOTO 88,90,92,94,96,98'DUKH
42 ON NQ-15 GOTO 50,50,50,50,50,50,50,
   50'DCMJ
43 ON NQ-23 GOTO 50,50,50,50,50,50,
   50'DYWJ
44 REM********************************
   **'BIXJ
45 REM LINES46-49 KEEP CHORD
   PROGRESSIONS IN RANGE OF
   TINWHISTLE (&ARRAY!)'BJMW
46 IF NT(B,N)>15 THEN NT(B,N)=NT(B,
   N)-7'FYIO
47 IF NT(B,N)<1 THEN NT(B,N)=NT(B,
   N)+7'FXGP
48 IF NT(B,N+1)<1 THEN NT(B,N+1)=NT(B,
   N+1)+7'IBUT
49 IF NT(B,N+1)>15 THEN NT(B,
   N+1)=NT(B,N+1)-7'ICWU
50 NEXT N'BBHB
51 NEXT B'BBUC
52 REM********************************
   *'BHGI
53 REM LINES 54-67 PLAY TUNE 2X'BUJK
54 FOR TW=1 TO 2'DEDH
55 FOR B=1 TO 8'DDEI
56 FOR N=1 TO S'DDSJ
57 ON NT(B,N)GOTO 71,72,73,74,75'CVNN
58 ON NT(B,N)-5 GOTO 76,77,78,79,
   80'DWWP
59 ON NT(B,N)-10 GOTO 81,82,83,84,
   85'DXFQ
60 POKE 54296,15:POKE 54277,136
   :POKE 54278,136:POKE 54276,17'EMYL
61 POKE 54273,H:POKE 54272,L
   :PRINT N$,'DTFI
62 IF N/S=INT(N/S)THEN
   PRINT"-----------------------------
   ----------":GOTO 64'IJGS
63 IF 2*N/S=INT(2*N/S)THEN
   PRINT"..........................
   ..........."'JIEU
64 FOR QT=1 TO 15:NEXT QT
   :POKE 54276,16'FRXM
65 NEXT N'BBHH
66 NEXT B'BBUI
67 NEXT TW'BCTK
68 GOSUB 114'BDJL
69 GOTO 15'BCNL
70 REM *** NOTE ASSIGNMENTS ***'BVNJ
71 N$="D":H=9:L=104:GOTO 60'ENDJ
72 N$="E":H=10:L=143:GOTO 60'EOWK
73 N$="F#":H=11:L=218:GOTO 60'EOHM
74 N$="G":H=12:L=143:GOTO 60'EOBM
75 N$="A":H=14:L=24:GOTO 60'ENWN
76 N$="B":H=15:L=210:GOTO 60'EOTO
77 N$="C#":H=17:L=195:GOTO 60'EOOQ
78 N$="D[^]":H=18:L=209:GOTO 60'EOVR
79 N$="E[^]":H=21:L=31:GOTO 60'ENLS
80 N$="F#[^]":H=23:L=181:GOTO 60'EOEK
81 N$="G[^]":H=25:L=30:GOTO 60'ENQL
82 N$="A[^]":H=28:L=49:GOTO 60'ENXM
83 N$="B[^]":H=31:L=165:GOTO 60'EOPN
84 N$="C#[^]":H=35:L=134:GOTO 60'EOCO
85 N$="D[^2]":H=37:L=162:GOTO 60'EOPP
86 REM ********'BIWL
87 REM 6 WAYS TO PLAY A DIATONIC
   CHORD, CHOSEN RANDOMLY AT LINE
   41'BXGA
88 NT(B,N)=NT(B,N-1)+2'DQYR
89 NT(B,N+1)=NT(B,N)+2:GOTO 46'ETST
90 NT(B,N)=NT(B,N-1)+4'DQBK
91 NT(B,N+1)=NT(B,N)-2:GOTO 46'ETTM
92 NT(B,N)=NT(B,N-1)+2'DQYM
93 NT(B,N+1)=NT(B,N)-4:GOTO 46'ETVO
94 NT(B,N)=NT(B,N-1)-2'DQAO
95 NT(B,N+1)=NT(B,N)+4:GOTO 46'ETUQ
96 NT(B,N)=NT(B,N-1)-2'DQAQ
97 NT(B,N+1)=NT(B,N)-2:GOTO 46'ETTS
98 NT(B,N)=NT(B,N-1)-4'DQCS
99 NT(B,N+1)=NT(B,N)+2:GOTO 46'ETSU
100 REM ********'BIWV
101 REM SPECIAL CASES FOR "D"
    CHORDS'BVMC
102 IF N>(S-2)GOTO 50'EHXA
103 QN=INT(RND(0)*10+1)
    :ON QN GOTO 50,50,50,50,50'HCXI
104 ON QN-5 GOTO 50,50,50,105,106'DTOE
105 NT(B,N+1)=NT(B,N)+2
    :NT(B,N+2)=NT(B,N)+4:GOTO 50'HLRM
106 NT(B,N+1)=NT(B,N)+4
    :NT(B,N+2)=NT(B,N)+2:GOTO 50'HLRN
107 IF N>(S-2)GOTO 50'EHXF
108 QQ=INT(RND(0)*10+1)
    :ON QQ GOTO 50,50,50,50,50'HCDN
109 ON QQ-5 GOTO 50,50,50,110,111'DTJJ
110 NT(B,N+1)=NT(B,N)-4
    :NT(B,N+2)=NT(B,N)-2:GOTO 50'HLTI
```

```
111 NT(B,N+1)=NT(B,N)-2
    :NT(B,N+2)=NT(B,N)-4:GOTO 50'HLTJ
112 REM ********'BIWY
113 REM PRINTER OPTION WITH TIMER
    LOOP'BBFH
114 IF S=6 GOTO 116'DFFC
115 IF S=8 THEN PRINT"PRINTOUT THIS
    FINE REEL?":GOTO 117'FGFM
116 PRINT" PRINTOUT THIS LOVELY
    JIG?"'BAXJ
117 PRINT"ANSWER 'Y'(YES) OR 'N'(NO)"
    :FOR ZT=1 TO 1000'EION
118 GET P$:IF P$="N" GOTO 152'EILI
119 IF P$="Y" GOTO 122'DFPI
120 NEXT ZT'BCWX
121 GOTO 152'BDHY
122 OPEN 4,4:PRINT#4,CHR$(14);T$;Z;
    CHR$(15)'EUBF
123 FOR B=1 TO 8'DDEC
124 FOR N=1 TO S'DDSD
125 ON NT(B,N) GOTO 136,137,138,139,
    140'CBXI
126 ON NT(B,N)-5 GOTO 141,142,143,144,
    145'DCFK
127 ON NT(B,N)-10 GOTO 146,147,148,
    149,150'DDPL
128 PRINT#4,N$,'BFYG
129 IF N/S=INT(N/S)THEN PRINT#4,"
    [SPACE34]"'HIOQ
130 IF N/S=INT(N/S)THEN PRINT#4,
    "--------------------------------
    --":GOTO 133'IMSL
131 IF 2*N/S=INT(2*N/S)THEN PRINT#4,
    "[SPACE34]"'JKVL
132 IF 2*N/S=INT(2*N/S)THEN PRINT#4,
    "................................
    .."'JKTO
133 IF N*B=S*8 GOTO 151'FHHF
134 NEXT N'BBHC
135 NEXT B'BBUD
136 N$="D":GOTO 128'CGXG
137 N$="E":GOTO 128'CGYH
138 N$="F#":GOTO 128'CGLI
139 N$="G":GOTO 128'CGBJ
140 N$="A":GOTO 128'CGUB
141 N$="B":GOTO 128'CGVC
142 N$="C#":GOTO 128'CGID
143 N$="D[^]":GOTO 128'CGMF
144 N$="E[^]":GOTO 128'CGNG
145 N$="F#[^]":GOTO 128'CGAH
146 N$="G[^]":GOTO 128'CGPI
147 N$="A[^]":GOTO 128'CGJJ
148 N$="B[^]":GOTO 128'CGKK
149 N$="C#[^]":GOTO 128'CGWL
150 N$="D[^2]":GOTO 128'CGHD
151 CLOSE 4'BBLB
152 RETURN'BAQC
```

END

BY TERRY M. BROWN

CW Trainer

for the Commodore 64



BOB CLARK

Use this program to train for the Morse Code portion of the amateur radio license test.

The International Morse Code is a special type of language that radio amateur operators use to communicate with people throughout the world. It is affectionately known as CW, an abbreviation for continuous wave. You must pass a test in receiving CW in order to obtain an amateur radio license from the Federal Communications Commission. Along with the code test, you must pass a multiple choice examination.

This program helps you learn CW so that the code-receiving test will be easier. What do you get by passing the test? You get the ability to "talk" to other radio amateurs in this country, as well as any other country in the world! Amateur radio is a great deal of fun.

Traditionally, the code test for Novice license consisted of 25 five-letter groups sent at a rate of five words per minute. To pass this code test, you were expected to copy accurately at least 25 consecutive letters (equal to one minute). A volunteer examiner may send a five-minute plain English message and test you on your comprehension of the message. A passing grade is 70%.

I highly recommend that people interested in studying Morse Code get some sort of text or written material so that the basic differences between the code for different letters can be examined. Two recommended texts are published by the Amateur Radio Relay League (ARRL) called *The Radio Amateur's License Manual* and *Tune in the World with Ham Radio.*

This program will help train you for the Novice code test as well as the General or Advanced code test (13 wpm). This program is great for anyone wishing to learn Morse Code, and will especially come in handy for scouts, military personnel and radio technicians.

How to Use This Program

Type in the program exactly as shown. When the program is typed in correctly and run, the introductory screen is shown and then a menu is displayed. Choose an item from the menu. Please note from the menu that you may practice certain groups of letters, numbers, punctuation, or all of them.

You will then be prompted to choose the speed at which you wish to receive code. After this information is inserted, you have five seconds to prepare yourself before code practice actually begins. Initially you may wish to view the letter as it is shown on the screen while the code is played through your TV or monitor speaker. Later, you will want to get a sheet of paper and copy down the code as it is sounded and check it against the letters on the screen after each session.

Each practice session lasts for two minutes regardless of code speed. Code speeds of 2 to 15 words per minute are allowed for in the program. Code speeds faster than 15 words per minute produce unintelligible code. ■

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

CW Trainer

```
100 DIM N1(50),CW$(50),DUR(50,6),
    BB(510)'BHHC
150 POKE 53281,6:POKE 53280,11
    :POKE 646,15'DXUG
160 SP$=" "'BDCC
200 GOSUB 60000'BFFW
300 GOSUB 6000'BEHX
400 FOR L=54272 TO 54296:POKE L,0
    :NEXT L'FRCE
500 S=54272:POKE S+5,15:POKE S+24,15
    :POKE S+6,40'HAWI
600 POKE S+21,57:POKE S+22,100
    :POKE S+23,8'GUVI
650 PRINT"[CLEAR,RIGHT4]
    EACH PRACTICE SESSION LASTS
    FOR"'BAQP
660 PRINT"[RIGHT13]TWO MINUTES."'BAML
700 PRINT"[DOWN3,RIGHT]
    SUGGESTED CODE SPEEDS ARE FROM 2
    TO 15"'BAJL
710 PRINT"[RIGHT12]WORDS PER
    MINUTE"'BANI
800 INPUT"[DOWN3,RIGHT5]
    WHAT CODE SPEED DO YOU WISH?";
    SPEED'BGRM
900 NUMBER=INT(SPEED*10.)'DQTJ
910 IF SPEED>4 THEN 950'DJMI
920 SS=4:TS=45:SU=2800:GOTO 1000'EUFM
950 IF SPEED>10 THEN 980'DKKM
960 SS=6:TS=65:SU=1000:GOTO 1000'EUAQ
980 SS=5:TS=60:SU=1250'DPAQ
1000 GOSUB 3500'BEJT
1050 POKE 53280,11:POKE 53281,11
     :POKE 646,15'DYOE
1100 PRINT"[CLEAR,DOWN3,RIGHT3]
     GET READY--CODE PRACTICE BEGINS
     IN[SPACE12]5 SECONDS"'BAOI
1200 FOR TT=1 TO 2000:NEXT TT'EKNY
1250 GOSUB 1400'BEGB
1260 PRINT CHR$(13);"WOULD YOU LIKE
     TO PRACTICE AGAIN (Y/N)"'CFGN
1270 INPUT ANS$:IF ANS$="Y" GOTO
     300'EMAH
1280 IF ANS$="N" GOTO 4900'DIGG
1290 IF ANS$<>"N" GOTO 1270'EIAI
1310 REM'BARW
1320 REM  -- SOUND AND LETTER ROUTINE
```

```
     --'BAXF
1400 REM'BARW
1450 POKE 53280,11:POKE 53281,11
     :POKE 646,12'DYLI
1500 FOR IA=1 TO NUMBER'DJPC
1600 IB=BB(IA):PRINT CW$(IB);SP$;'CVTF
1700 FOR IC=1 TO N1(IB)'DJND
1750 GET X$:IF X$="[F7]
     "THEN GOSUB 6000'FJVK
1800 FOR ID=1 TO 7*DUR(IB,
     IC)*SS/SPEED'GVCK
1900 POKE S,31:POKE S+1,21:POKE S+3,8
     :POKE S+2,0:POKE S+4,65:NEXT'KCEO
2000 FOR ID=1 TO TS/SPEED:POKE S+4,64
     :NEXT ID'HTID
2100 NEXT IC'BCOV
2200 FOR IC=1 TO SU/SPEED:NEXT IC'FNLC
2300 NEXT IA'BCMX
2350 RETURN'BAQC
2810 REM'BARD
2820 REM SUBROUTINE TO READ DATA
     TABLES'BBAM
2840 REM'BARG
2900 FOR I=1 TO 42'DEHF
3000 READ N1(I),CW$(I)'BMKX
3100 FOR J=1 TO N1(I)'DHGY
3200 READ DUR(I,J)'BIEY
3300 NEXT J:NEXT I'CDIY
3400 RETURN'BAQY
3510 REM'BARB
3520 REM RANDOM NOTE GENERATION
     SUBRUTINE'BEAL
3540 REM'BARE
3600 FOR I=1 TO NUMBER'DIAF
3700 BB(I)=INT(RND(0)*NR)+SW'FOCI
3800 NEXT I'BBCD
3900 RETURN'BAQE
3920 REM'BARG
4000 REM DATA FOR CHARACTERS'BRLB
4040 REM'BARA
4100 DATA 1,E,1,2,I,1,1,1,T,3,2,M,3,3,
     2,A,1,3,2,N,3,1'BSAF
4200 DATA 3,D,3,1,1,3,G,3,3,1,3,K,3,1,
     3,3,O,3,3,3,3,R,1,3,1'BYKI
4250 DATA 3,S,1,1,1,3,U,1,1,3,3,W,1,3,
     3,4,B,3,1,1,1'BQIL
4300 DATA 4,C,3,1,3,1,4,F,1,1,3,1,4,H,
     1,1,1,1,4,J,1,3,3,3'BWAI
4350 DATA 4,L,1,3,1,1,4,P,1,3,3,1,4,Q,
     3,3,1,3,4,V,1,1,1,3'BWRN
4400 DATA 4,X,3,1,1,3,4,Y,3,1,3,3,4,Z,
     3,3,1,1,5,1,1,3,3,3,3,5'BBDK
4500 DATA 2,1,1,3,3,3,5,3,1,1,1,3,3,5,
     4,1,1,1,1,3,5,5,1,1,1,1,1'BDVL
4600 DATA 5,6,3,1,1,1,1,5,7,3,3,1,1,1,
     5,8,3,3,3,1,1,5,9,3,3,3,3,1,
     5'BHIN
4700 DATA 0,3,3,3,3,3,6,PERIOD,1,3,1,
     3,1,3,6,COMMA,3,3,1,1,3,3,6'BEPO
4800 DATA ? MARK,1,1,3,3,1,1,5,SLASH,
     3,1,1,3,1,6,GOOF,1,1,1,1,1,1,1,
     " ",0'BJGQ
4900 END'BACF
6000 REM'BARX
6040 REM--MENU SUBROUTINE'BQUH
6080 REM'BARG
6085 POKE 53280,0:POKE 53281,0
     :POKE 646,12'DWLR
6090 PRINT"[CLEAR,DOWN,RIGHT16]MENU
     :"'BAEL
6100 PRINT"[DOWN,RIGHT5]
     CHOOSE FROM AN ITEM BELOW:"'BAEH
6110 FOR I=1 TO 2500:NEXT I'EIDE
6120 PRINT"[RIGHT2]1. PRACTICE ON
     LETTERS: A,E,I,M,N,T":PRINT'CBFL
6140 PRINT"[RIGHT2]2. PRACTICE ON
     LETTERS: D,G,K,O,R":PRINT'CBPN
6160 PRINT"[RIGHT2]3. PRACTICE ON
     LETTERS: B,S,U,W":PRINT'CBVO
6180 PRINT"[RIGHT2]4. PRACTICE ON
     LETTERS: C,F,H,J":PRINT'CBJQ
6200 PRINT"[RIGHT2]5. PRACTICE ON
     LETTERS: L,P,Q,V":PRINT'CBAJ
6220 PRINT"[RIGHT2]6. PRACTICE ON
     LETTERS: X,Y,Z":PRINT'CBYL
6240 PRINT"[RIGHT2]7. PRACTICE ON
     NUMBERS: 1 THROUGH 5":PRINT'CBWO
6260 PRINT"[RIGHT2]8. PRACTICE ON
     NUMBERS: 6 THROUGH 0":PRINT'CBXQ
6280 PRINT"[RIGHT2]9. PRACTICE ON
     PUNCTUATION:[SPACE2]PERIOD,"
     :PRINT'CBET
6290 PRINT"[RIGHT5]COMMA, ? MARK,
     SLASH, GOOF (ERROR)":PRINT'CBYT
6300 PRINT"[RIGHT]10. RANDOM PRACTICE
     ON ALL OF THE ABOVE"'BATL
6320 PRINT"[RIGHT]11. QUIT FOR NOW"
     :PRINT'CBNI
6340 INPUT"WHICH DO YOU WANT";SV'BDUL
6360 ON SV GOTO 6400,6450,6500,6550,
     6600,6650,6700,6750,6800,6850,
     4900'CGNT
6400 SW=1:SX=6:NR=6:GOSUB 3500
     :GOTO 400'FUCK
6450 SW=7:SX=11:NR=5:GOSUB 3500
     :GOTO 400'FVAP
6500 SW=12:SX=15:NR=4:GOSUB 3500
     :GOTO 400'FWWL
6550 SW=16:SX=19:NR=4:GOSUB 3500
     :GOTO 400'FWFQ
6600 SW=20:SX=23:NR=4:GOSUB 3500
     :GOTO 400'FWUM
6650 SW=24:SX=26:NR=3:GOSUB 3500
     :GOTO 400'FWBR
6700 SW=27:SX=31:NR=5:GOSUB 3500
     :GOTO 400'FWCN
6750 SW=32:SX=36:NR=5:GOSUB 3500
     :GOTO 400'FWDS
6800 SW=37:SX=41:NR=5:GOSUB 3500
     :GOTO 400'FWEO
6850 SW=1:SX=41:NR=41:GOSUB 3500
     :GOTO 400'FWUT
60000 REM'BARV
60010 REM--SUBRUTINE TO INITIALIZE
      SCREEN AND START PROGRAM'BTTE
60030 REM'BARY
```

64 USERS ONLY/CW TRAINER

```
61000 PRINT"[CLEAR,DOWN2,RIGHT6]
      MORSE CODE TRAINING
      PROGRAM"'BAMA
61020 PRINT"[DOWN2,RIGHT11]
      BY TERRY M. BROWN"'BAFF
61060 PRINT"[DOWN6]";SPC(25);"[BLACK,
      CMDR I9]"'CFVF
61080 PRINT SPC(29);"[RVS] [RVOFF]
      "'CEKB
61100 PRINT SPC(12);"[RVS,SHFT POUND,
      SPACE19,RVOFF]"'CEFD
61120 PRINT SPC(8);"[RVS,CMDR F,
      CMDR D,RVOFF,SPACE2,RVS,SPACE3,
      RVOFF,SPACE10,CMDR *,SHFT POUND]
      "'CDWB
61140 PRINT"[RED,CMDR POUND8,BLACK,
      RVS,CMDR V,CMDR C,RVOFF] [RVS,
      SHFT POUND,SPACE3,CMDR *,RVOFF,
      SPACE9,RVS,SHFT POUND,CMDR *,
      RVOFF]"'BAWK
61160 PRINT SPC(7);"[RVS,SPACE25,
      RVOFF]"'CDID
61180 PRINT"[YELLOW,DOWN,RIGHT13]
      MORSE CODE KEY"'BABG
61200 GOSUB 2800'BELA
61220 DATA 4,10,11,12,1,42,16,10,7,1,
      42,2,12,42,17,13,6'BTXD
61240 NUMBER=17'BIBF
61250 SPEED=7'BGOA
61260 FOR I=1 TO NUMBER'DIAD
61280 READ BB(I)'BFOC
61300 NEXT I'BBCA
61400 FOR L=54272 TO 54296:POKE L,0
      :NEXT L'FRCB
61500 S=54272:POKE S+5,15:POKE S+24,15
      :POKE S+6,40'HAWF
61600 POKE S+21,57:POKE S+22,100
      :POKE S+23,8'GUVF
61650 PRINT"[DOWN2]";SPC(10);'CFVE
61700 FOR IA=1 TO NUMBER'DJPC
61800 IB=BB(IA):PRINT CW$(IB);'CRRE
61900 FOR IC=1 TO N1(IB)'DJND
61950 IF DUR(IB,IC)=0 THEN 62400'DQRK
62000 FOR ID=1 TO 7*DUR(IB,
      IC)*6/SPEED'GUVA
62100 POKE S,31:POKE S+1,21:POKE S+3,8
      :POKE S+2,0:POKE S+4,65
      :NEXT'KCEF
62200 FOR ID=1 TO 50/SPEED:POKE S+4,64
      :NEXT ID'HTXC
62300 NEXT IC'BCOC
62400 FOR IC=1 TO 2500/SPEED
      :NEXT IC'FPRC
62500 NEXT IA'BCME
62600 PRINT"!!!"'BABE
62700 FOR I=1 TO 2500:NEXT I'EIDD
63000 RETURN'BAQY
```

END

ADVENTURE ROAD/MAPPING MADE SIMPLE

Continued from pg. 80

out is wanted for committing a murder while escaping from a Texas prison. In order to track down all the clues and fit the pieces of this puzzle together, you must hit the streets of the Big Apple.

And those streets are realistically portrayed in the descriptions of each block of the city. All the tourist attractions—St. Patrick's Cathedral, Times Square, the United Nations—are there, and so are many nuances of the New York landscape, such as obscure back streets that are realistically laid out and restaurants like Nedick's and Chock Full-o-Nuts. You've got to stop in for a bite regularly, or your energy level falls too low and you'll wake up in the hospital. Inevitably this leads to your arrest when you're recognized as Hollings, and the next stop is a Texas jail cell. To buy food you've got to earn money by panhandling on the street or washing car windshields.

Amnesia is structured in a more linear fashion than typical adventures, for it leads you through the same parts of the story in a series of events that resemble the plot of a novel. Disch uses this technique to ensure that you meet certain characters at specific points in the game, people like the loudmouth Texan Lude Dudley. In these encounters you'll often read several succeeding screens of text, punching the RETURN key to continue. This also happens when you have a lengthy dream or a flashback, both of which furnish hints about your past.

Eventually it becomes evident that you recently visited Texas and discovered something so sensational that someone is trying to make sure you forget it—and if you don't cooperate, they'll simply kill you. Several other alternative conclusions await the persevering software sleuth, a feature I always appreciate in an adventure game.

The scoring system is unusual, awarding points in three areas: detective, character and survival. These determine your overall score and rating. The status report also shows your energy level and inventory. With a printer you can obtain hard copy of the game as you play it.

Two parsers are on board, one for interpreting commands about navigating the streets and another for talking to people and dealing with objects. Both accept full and multiple sentences and have a 1,700-word vocabulary. And for those who are having trouble, encoded clues and answers are provided in the manual. *Amnesia* is one of the few text adventures that I've found as absorbing to read as it is satisfying to play.

More Clues

Trinity: To get the gnomon to fit in the hole on the sundial, you must reverse the threads by first climbing the arbor and activating the Klein bottle effect. When the shadow clicks on the sundial, push the lever.

Shard of Spring: Write down the names of everyone you meet, especially in Islandia, as well as the lyrics to any songs you hear.

Rings of Zilfin: Keep walking north and south between the first two towns and collect a big supply of mushrooms before going anywhere else. To get past the K-plants, use two parzins and two purlets before you enter the location where they are found.

JIFFIES/VERTICAL BAR CHARTING

Continued from pg. 57

give purple (4) as the alternate color. (On a black-and-white TV it appears white and gray.)

Run the program. When the chart is completed, an INPUT statement prevents scrolling. Press RETURN and run again to repeat. **C**

Before typing these programs, read "How to Enter Programs," and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

Vertical Bar Charting

```
10 PRINT CHR$(147):DIM A%(15),
   D%(72)'DTUC
20 INPUT"0)FULL OR 1)HALF COLUMN";B
   :IF B GOTO 40'DGRG
30 INPUT"DUAL COLOR (Y/N)";Q$
   :IF Q$="Y" THEN DC=3'FJRI
40 INPUT"ZERO BOTTOM (Y/N)";Q$
   :IF Q$="N" THEN Z=1'FIWJ
50 NB=36:I=2:IF B OR DC THEN NB=72
   :I=1'HSIK
60 FOR X=1 TO NB STEP 2
   :D%(X)=(40*RND(1)+1)*Z
   : REM BOTTOM'KCEO
70 D%(X+1)=D%(X)+99*RND(1)+8
   : REM TOP'HVIM
80 IF D%(X+1)>D%(0) THEN D%(0)=D%(X+1)
   : REM HIGHEST TOP'HILQ
90 NEXT'BAEF
100 DATA 97,126,97,123'BNWX
110 FOR X=0 TO 3:READ A%(X):NEXT
    :R=2'GNQC
120 IF B=0 THEN FOR X=0 TO 15
    :READ A%(X):NEXT:R=8'JQDG
130 DATA 224,228,239,249,226,120,119,
    99,224,100,111,121,98,248,247,
    227'BLNK
140 HV=R*20:S%=1+D%(0)/HV:IV=S%*R'HWLJ
150 PRINT CHR$(147)"DEMO CHART"
    :FOR X=1 TO 40:L$=L$+CHR$(164)
    :NEXT'JVOM
160 FOR X=20 TO 0 STEP-1
    :X$=MID$(STR$(IV*X),2)'JRWK
170 P$=X$+LEFT$(L$,40-LEN(X$))
    :PRINT P$;:NEXT:X%=1'IYTM
180 FOR X=1 TO NB STEP 2:B%=D%(X)/S%
    :T%=D%(X+1)/S%'JBDO
190 E=B%-(INT(B%/R)*R):GOSUB 240
    :E=R'HSNM
200 B%=B%+R:IF B%<T% THEN GOSUB 240
    :GOTO 200'HRRD
210 B%=T%:E=T%-(INT(T%/R)*R)
    :IF E THEN E=E+R:GOSUB 240'LAYJ
220 IF DC THEN CC=ABS(CC-1)'FJOD
230 X%=X%+I:NEXT:INPUT Q$:END'FKWE
240 Y%=B%/R:SA=1866-(Y%*40)+X%
    :POKE SA,A%(E):POKE SA+54272,DC+CC
    :RETURN'LSFQ
```

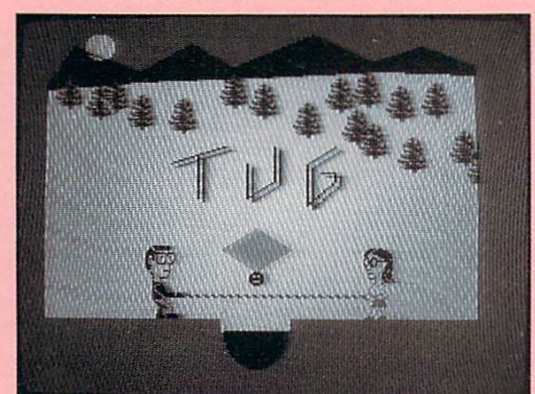
END

BY MARK JORDAN

TUG

for the Commodore 128

For this tug-of-war game you need more than strength—you need reflex and willpower.



As its name implies, TUG is a game of strength. Based on the tug-of-war concept, this one- or two-player game yields many wins to the mighty. But in this case, the strength is not applied to the joystick. (Who wants a broken joystick handle, right?) Instead, you must exercise strength of will—willpower.

TUG is also a game of reflex. The quicker-moving may be able to whip the stronger-willed. However, reflexes can hurt you—TUG is also a game of wit.

Mostly, TUG is a game that demonstrates just how easily a game with an attractive play field and effective play action can be written on the Commodore 128. To match the effects on a 64, you would have to resort to machine language and several reference books.

Begin by typing it in. Save it as always before running it the first time. Since the program is written in BASIC, it's unlikely you would crash it with bad data or other errors, but it's not impossible. However, one of the many subtle beauties of the 128 is that you can easily recover from most crashes. How? Just hold down the RUN/STOP key and press the reset button. When the reset has been done, you'll find yourself in the 128's built-in machine language monitor. Type X and press RETURN, and you'll be back in BASIC with the program intact.

When you run the program, you have to put up with a mild wait while the screen designs itself. You can speed things up considerably by adding a FAST command at the very beginning of the program (say, line 5).

The game starts with Clark and Clara, our two heros, being introduced. If your joystick is in port 1, you will maneuver Clark. Otherwise, Clara is your sprite. Now it's pull-time. Clark and Clara are squared off in a beautiful mountain setting. Connecting them is a 144-pixel long rope, stretched taut. Between them is a black seething pit of who-knows-what.

Above the pit is a diamond. Pay attention to this diamond. A black ball will appear at one of the points of this diamond. If it is on the left point, quickly push your joystick to the left. If you push your joystick to the left before your opponent does, your sprite (let's say, Clark) will pull Clara a pixel closer to doom.

There is one thing, however, you must watch for. The ball may not always be black—it may be red. If it is, then don't push left. The first one who does will lose ground instead of gaining it. If no one pushes left after a moment, the ball will change. It takes approximately 50 pixels before Clark or Clara get thrown in the pit.

It's clear to see how TUG is a game of reflex and wit, but how about strength? The answer to that will become apparent in your first real tussle. Fifty pixels is a long way, particularly when you consider that sometimes your opponent will pull you toward the pit, cancelling some of your victories.

Willpower is the key—and lots of it. If you get distracted or frustrated because it's taking so long to yank ol' Clara into the cesspool, you may find Clara yanking you in that direction. If you want faster games, change N = 1 in line 480 to N = 2 (or 3, 4, etc.). This way each tug will pull a little farther.

Oh yes, I did say that TUG can be played solitaire. When the open screen comes up, just choose the one-player option and level (1-3). Level 3 is best for beginners, level 1 for the masochistic type.

Winning isn't everything—you need to win big. In TUG that means quick. There's a timer that will display how long it took you to dump your opponent after each round.

I've been programming Commodore computers for three years now. Creating TUG was the best task I have yet undertaken. The Commodore 128, with its superb graphics and wonderful BASIC 7.0, is one mean machine. ■

Before typing these programs, read "How to Enter Programs," and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

TUG

```
10 GRAPHIC 3,1'BDJX
20 FOR T=3584 TO 3927:READ A$
   :POKE T,DEC(A$):NEXT'HUQG
30 FOR T=3928 TO 4032:POKE T,0
   :NEXT'FOHF
40 FOR T=3968 TO 3975:READ A$
   :POKE T,DEC(A$):NEXT'HUAI
50 COLOR 4, 3:COLOR 0,8:COLOR 5,1
   :COLOR 1,1 :COLOR 2,6'FTTJ
60 CIRCLE 2,10,10,2,3:PAINT 2,10,10,1
   :SSHAPE CR$,8,7,12,13:SCNCLR'ELOM
70 COLOR 3,11:BOX 3,70,120,88,137,45,1
   :COLOR 3,3'DEEL
80 COLOR 2,8:CIRCLE 2,20,10,5,7
```

```
   :PAINT 2,20,14,1:COLOR 2,6'EEMN
90 DRAW 1,0,30 TO 10,10 TO 35,
   25 TO 55,8 TO 70,22 TO 100,
   2 TO 121,18 TO 140,9 TO 159,20'JWOU
100 DRAW 1,0,35 TO 35,30 TO 80,
    27 TO 125,23 TO 159,25
    :PAINT 1,5,27,1'GMEG
110 X=50:Y=80:C=2:GOSUB 120:X=X-2
    :Y=Y-2:C=1:GOSUB 120:GOTO 150'LIVK
120 DRAW C,X,Y TO X+20,Y-10
    :DRAW C,X+10,Y-5 TO X+10,Y+20'KDIK
130 DRAW C,X+28,Y TO X+28,
    Y+20 TO X+38,Y+10 TO X+38,
    Y-10'LDPM
140 DRAW C,X+60,Y-10 TO X+50,
    Y TO X+50,Y+24 TO X+60,
    Y+10 TO X+60,Y+5 TO X+55,Y+5'RPCT
145 RETURN'BAQE
150 DRAW 3,0,168 TO 66,168
    :DRAW 3,92,168 TO 159,168'EETI
160 CIRCLE 3,79,168,13,30,90,270
    :DRAW 1,68,175 TO 91,175'DLBK
170 PAINT 3,1,171,1:PAINT 3,1,1,1
    :PAINT 1,71,177,1'DDYJ
180 CD$="[HOME]":FOR T=1 TO 25
    :CD$=CD$+"[DOWN]":NEXT'HQML
190 X(1)=201:Y(1)=174:X(2)=171
    :Y(2)=191:X(3)=142:Y(3)=175
    :X(4)=171'HFHU
200 Y(4)=158:J(3)=1:J(5)=2:J(7)=3
    :J(1)=4'FGCF
210 ROPE=112:E$=CHR$(27):L$=CHR$(13)
    :L$(1)="CLARK":L$(3)="CLARA"
    :W$(1)="CLARA":W$(3)="CLARK"'JULS
220 PRINT E$"M"'BCEY
230 SPRCOLOR 6,1:SPRSAV 5,TR$
    :SPRSAV 6,8:SPRSAV 7,6
    :SPRSAV 7,5'FBXI
240 FOR T=1 TO 17:READ X,Y
    :GSHAPE TR$,X,Y,4:NEXT'GTJI
250 SLOW'BBKC
260 A$="V1O1C00A01HD00.AQB"
    :B$="O1HCFEDQ":PL$=A$+A$+B$+LEFT$
    (A$,17)'HWXS
270 GRAPHIC 0:MOVSPR 1,140,98
    :MOVSPR 3,212,98'DVTJ
280 PRINT"[CLEAR,BLACK,DOWN3]","
    [SPACE2]MEET THE TUGGERS:"
    :FOR T=1 TO 700:NEXT'FIBO
290 SPRITE 1,1,1,1:SPRITE 3,1,1,1'CRNJ
300 PRINT LEFT$(CD$,10),"[SPACE3]
    CLARK[SPACE2]&[SPACE2]CLARA"'CJVD
310 PRINT"[DOWN2]CLARK WILL USE PORT
    2, CLARA HAS PORT 1."'BARI
320 VOL 15:PLAY PL$'CHKC
330 PRINT"PRESS [WHITE]B[BLACK]
     TO BEGIN, 1 TO PLAY
    SOLITAIRE."'BAVL
340 LV=16:NP=0'CIQE
350 GET KEY A$:IF A$="B"THEN 420'FIPH
360 IF A$<>"1"THEN 350'EFVG
370 NP=1:PRINT"[DOWN]LEVEL (1 -
    3)"'CEPJ
380 GET KEY A$:A=VAL(A$):LV=A+3
    :IF A<1 OR A>10 THEN PRINT"[BELL]
    ";:GOTO 380'NYGT
390 PRINT"[DOWN]PRESS 1 TO CONTROL
    CLARA, 2 FOR CLARK."'BAJQ
400 GET KEY A$:A=VAL(A$):WP=A
    :IF A<1 OR A>2 THEN PRINT"[BELL]";
    :GOTO 400'MWSL
410 IF WP=2 THEN WP=3:ELSE WP=1'GKAF
420 GRAPHIC 3:SPRITE 2,1,7,1
    :SPRITE 4,1,3,1'DTRG
430 SPRITE 5,1,10,0,1:SPRITE 6,1,10,0,
    1:SPRITE 7,1,10,0,1'DKOK
440 MOVSPR 1,93,176:MOVSPR 2,98,197
    :MOVSPR 3,252,176:MOVSPR 4,252,
    197'EQQN
450 MOVSPR 5,RO,204:MOVSPR 6,RO+48,204
    :MOVSPR 7,RO+96,204'FIDN
460 REM -- MAIN PROGRAM LOOP'BRUJ
470 TI$="000000":VOL 15'CGUJ
480 DO:Z=0:R=INT(RND(1)*4)+1:C$=CR$
    :CO=1:N=1'KATS
490 CC=RND(1):IF CC<.2 THEN CO=3
    :N=-1'IQHQ
500 MOVSPR 8,X(R),Y(R):SPRITE 8,1,
    CO'CUDF
510 Z=Z+1:IF Z=LV THEN BEGIN
    :IF NP=1 THEN X=N:S=WP
    :GOTO 560'MWYN
520 BEND:IF CO=3 THEN LOOP'FFEF
530 J1=JOY(1)AND 127:J2=JOY(2)AND
    127'GRBJ
540 IF J(J1)=R THEN X=N:S=3
    :GOTO 560'GPPK
550 IF J(J2)=R THEN X=-N:S=1
    :ELSE 510'HPAM
560 SPRITE 8,0,CO:FOR T=1 TO 7
    :MOVSPR T,+X,+0:NEXT'ITPO
570 MOVSPR S,+0,+1'DGYJ
580 FOR T=1 TO 50:NEXT'EFYK
590 MOVSPR S,+0,-1'DGAL
600 SOUND 1,2500, 5,,,58,0'BPVD
610 B=BUMP(2):IF B >0 AND B<8 THEN
    EXIT'IKJI
620 LOOP'BAKC
630 REM -----'BFLE
640 VOL 4:SOUND 1,9000,100,1,2000,55,
    2,880'CDRL
650 IF RSPPOS(1,0)>135 THEN 670'EMBJ
660 X=-1:Y=1:W=3:V=0:U=175:GOSUB 740
    :X=0:V=1:U=250:GOSUB 740
    :GOTO 680'MOGX
670 X=1:Y=1:W=1:V=0:U=175:GOSUB 740
    :X=0:V=1:U=250:GOSUB 740'KKWV
680 GRAPHIC 4,0,22:T$=MID$(TI$,4,1)+"
    :"+MID$(TI$,5)'GAXR
690 PRINT LEFT$(CD$,24)"[SPACE2]
    NOT BAD, "W$(W)", BUT IT TOOK YOU
    "T$'CPSU
700 PRINT"[SPACE4]TO WHIP "L$(W)".
```

JIFFIES/SX-64 RENUMBER

Continued from pg. 60

```
1250 PRINT"[RVS]"TN$EX$'BGYC
1260 FOR I=1 TO 150:NEXT
     :REM TIME DELAY'FQKI
1270 PRINT"[DOWN,SPACE6,SHFT P]RESS
     [RVS,SHFT R,SHFT E,SHFT T,SHFT U,
     SHFT R,SHFT N,RVOFF]"'BANL
1280 GET A$:IF A$=CHR$(13)THEN
     1300'FNAI
1290 PRINT"[RVOFF]"TN$EX$
     :FOR I=1 TO 150:NEXT
     :GOTO 1250'GSBM
1300 INPUT"[HOME,DOWN7,SHFT E]NTER
     [RVS,L. BLUE,SHFT E]XTERNAL
     [RVOFF,WHITE] [SHFT D]RIVE # ";
     EN'BDDG
1310 IF EN>13 OR EN<8 THEN 1300'FLDC
1320 IF(EN=IN)THEN 1300'DKJC
1330 PRINT#1,"M-W"CHR$(119)CHR$(0)
     CHR$(2)CHR$(EN+32)CHR$(EN+64)
     'IAJK
1340 CLOSE 1:OPEN 1,14,15'CJDC
1350 PRINT#1,"M-W"CHR$(119)CHR$(0)
     CHR$(2)CHR$(IN+32)CHR$(IN+64)
     'IARM
1360 CLOSE 1:OPEN 1,IN,15,"I"'CKPF
1370 PRINT"[DOWN5,SHFT A]LL [SHFT D]
     ONE"'BAUH
1380 END'BACE
```

END

128 USERS ONLY/TUG

```
     [SPACE2]TRY AGAIN?[SPACE3]
     Y/N"'BFRJ
710  VOL 15:TEMPO 20:PLAY PL$'DLTG
720  GET KEY A$:IF A$="Y"THEN GRAPHIC
     0,1:GOTO 330:ELSE IF A$<>"N"THEN
     720'MSUP
730  GRAPHIC 0,1:END'CELG
740  DO:MOVSPR W,+X,+Y:MOVSPR W+1,+X,
     +Y'IPTO
750  LOOP UNTIL RSPPOS (W,V)=U
     :RETURN'FIEL
760  REM -----'BFLI
770  DATA 07,FE,E0,1B,FF,F0,3D,FF'BXYN
780  DATA E0,7F,00,40,FF,FF,7C,FE'BXMO
790  DATA 81,C2,E6,89,52,D6,81,22'BXVP
800  DATA D6,81,12,D0,C3,0C,E0,7E'BXYH
810  DATA 78,F8,00,20,F0,00,20,70'BXFI
820  DATA 00,10,20,07,E0,18,00,20'BXYI
830  DATA 0C,00,40,04,40,40,06,3F'BXXJ
840  DATA 80,04,10,00,06,10,00,00'BXCK
850  DATA FE,00,00,EB,00,00,DF,80'BXIM
860  DATA 00,FF,C0,00,DF,E0,00,EF'BXUN
870  DATA F0,00,FB,FF,DE,FE,FF,DE'BXBO
880  DATA FF,3F,DC,FF,00,00,60,C0'BXDP
890  DATA 00,38,30,00,1E,0C,00,0F'BXEQ
900  DATA 82,00,07,E1,00,07,A1,00'BXVH
910  DATA 0F,21,00,0F,21,00,1F,1F'BXXJ
920  DATA E0,1F,DF,F0,1F,DF,F0,00'BXVK
930  DATA 00,00,00,07,DE,00,1F,7F'BXBL
940  DATA C0,3D,FF,F0,78,FF,F8,70'BXFM
950  DATA 1F,F8,39,C7,FC,6B,60,F4'BXON
960  DATA 4E,3F,FC,4E,20,3C,6B,60'BXVO
970  DATA 7C,33,C0,FC,20,00,FC,1C'BXGP
980  DATA 02,EC,00,05,D8,0F,0B,F8'BXVQ
990  DATA 00,13,7C,08,63,F8,07,83'BXWR
1000 DATA BC,00,41,D6,00,42,FB,00'BXPX
1010 DATA 00,C7,00,01,58,C0,02,20'BXUX
1020 DATA 20,04,02,10,04,41,08,02'BXKY
1030 DATA 20,88,0D,0F,08,33,F0,30'BXAB
1040 DATA 44,C0,C0,3C,7F,00,03,FF'BXUC
1050 DATA 80,00,FF,80,01,FF,C0,03'BXDD
1060 DATA FF,C0,00,88,80,01,14,80'BXCE
1070 DATA 01,24,40,02,22,40,04,42'BXNE
1080 DATA 40,0F,87,C0,3F,9F,C0,00'BXLG
1090 DATA 00,08,00,00,28,00,00,08'BXIG
1100 DATA 80,00,A8,80,02,2E,80,02'BXDY
1110 DATA AE,00,00,2A,20,02,0A,A0'BXWA
1120 DATA 02,BE,80,00,2E,20,08,AF'BXWB
1130 DATA A0,0A,2A,80,02,AA,08,20'BXIC
1140 DATA 2E,88,2A,AA,A8,08,8E,20'BXHD
1150 DATA 02,AB,88,08,AA,A8,02,AA'BXHE
1160 DATA 80,00,0F,00,00,0F,00,00'BXJE
1170 DATA 00,3E,00,00,FF,80,01,C9'BXGG
1180 DATA C0,01,FF,C0,01,FF,C0,01'BXYH
1190 DATA C1,C0,00,FF,80,00,3E,00'BXQI
1200 DATA DB,6D,B6,6D,B6,DB,00,00'BXCA
1210 DATA 2,26, 14,32, 20,28, 30,38,
      46,40, 65,25, 76,31, 92,42'BVLF
1220 DATA 104,27, 114,24, 126,32, 139,
      30, 110,46, 116,54, 130,62'BXAG
1230 DATA 149,58, 155,70'BNUB
```

END

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IF YOU WIN, GET THREE PRIZES!

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ADDRESS ______________________________

CITY ____________ STATE ______ ZIP CODE ______

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☐ Yes—if I win, extend my membership for four months?

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Do you currently own a modem?

☐ Yes—if I win, send me a substitute prize.

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CHALLENGE OF THE MONTH #4

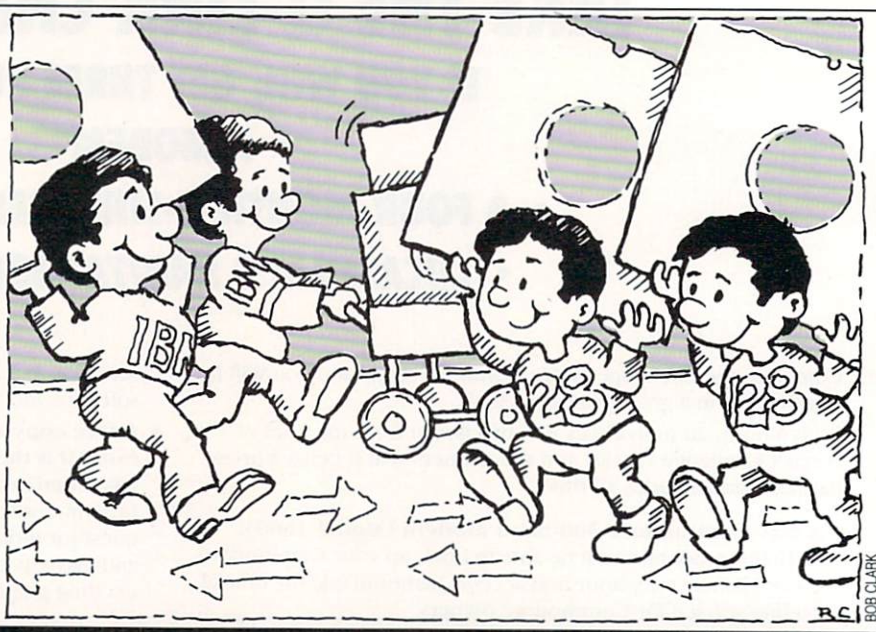
MP WN WA AD SE ER
RM BA IN TI FT CK

Two pairs of letters in each line of this puzzle are already filled in. To solve the puzzle, insert the remaining pairs of letters into the blank squares. Do not rearrange any letters, and put only one letter in each box. When you are finished you will have spelled 6 eight-letter computer terms (reading across). Each pair of letters is used only once, so you may cross them off as you use them.

D	O			L	O		
J	O	Y	S				
S	O					R	E
C	O			U	T		
D	A	T	A				
T	E					A	L

BY M. GARAMSZEGHY

Super Sweep 128



Transfer program and data files between the 128 and the IBM-PC.

There are numerous types of computers and operating systems, most of which are not compatible. Trying to share program and data files between incompatible computers can be a major headache when you work with several machines. I personally own a VIC 20 and a Commodore 128. I also use a Commodore PC-10 MS-DOS computer and a Radio Shack TRS-80 CP/M-based machine in a business environment.

These machines are incompatible with each other, yet I regularly share data files, and sometimes even program files, between all four machines. For example, *WordStar* text files written on the IBM-PC will work perfectly with CP/M *WordStar* on the 128 or TRS-80. With ASCII to PETSCII character conversion, the text files will also work with most word processors, such as *Paperclip* and *Pocket Writer*, on the 128 and/or VIC 20.

The same goes for spreadsheet models from *Multiplan* and *CalcStar* and database files from *dBase II*. In fact, you can interchange data files for any program running under MS-DOS with an analogous CP/M version, and if it exists, a 128 VIC 20 version.

There are several ways to exchange files between computers. One method involves a direct connection between the computers via a null modem cable or other data link. This method must have the two machines close enough together that they can be connected by a wire. The second method is an extension of the first: the wire is replaced by two modems and a telephone line. For this to work, you generally need either a person at both ends to control the transfer or a "smart" terminal program at one end that can be controlled from the other end. Both methods suffer from the drawback that they require two machines.

The third method, which is much more versatile, is to transfer the files on an intermediate storage medium such as a floppy disk. No connections or wires are required and you only need to use one machine at a time to do the transfer. The drawback of this method is that you need to find a disk format that can be understood by both machines. Unfortunately, there are as many different disk formats as there are computers.

If you can get one of your computers to read and write the disk format of the other, you have solved the problem. With that in mind, I wrote a short program called Super Sweep 128 which allows the 1571 disk drive to read and write in three basic formats: normal Commodore DOS type SEQ files, 128 CP/M and MS-DOS. The program also does ASCII <> PETSCII conversions of text files, if desired. In order to better understand how the program works, a simple description of the structure of CP/M and MS-DOS disks is in order.

Disk Compatibility

The 128 is a remarkable machine, especially when connected to a 1571 disk drive. This combination can read and write just about any disk format available in 5 1/4-inch size. Many different formats such as Epson, KayPro, Osborne and CP/M-86 are supported automatically by CP/M mode on the 128. The 128/1571 combo can also read and write MS-DOS disks as well as many other formats. Although this must be performed under software control, it is relatively simple once you figure out the logical structure of the foreign disk.

Several factors determine the compatibility of disks among the various machines. The first, and perhaps the most important, is the physical structure of the disk. Obviously you cannot read an 8-inch disk on a drive designed for $5\frac{1}{4}$-inch disks; ditto for $3\frac{1}{2}$-inch micro floppies. If the disk fits into the drive, the next problem is the recording method used to store the data on the disk.

There are many recording methods, but again, most are incompatible with each other. One of the most common is MFM (modified (or maximum) frequency modulation) used by MS-DOS, TRS-DOS and most CP/M formats. Commodore uses a different technique called GCR (for group coded recording) for the 1541/1571/4040 and most of its other disk drives. The Commodore 1571 drive is probably the only drive on the market which contains hardware support for both recording methods.

The third problem is the logical organization of the disk: how the files are stored, the location and structure of the directory, and so on. This third aspect is the key for interchanging disks between different computers with physically compatible disk drives. The logical organization of virtually all microcomputer disk formats is software-controlled.

In most computers, the actual operation of the disk storage system is hidden from the user by a high level screen, usually called a disk operating system or DOS. The DOS is a set of disk control

routines indirectly called by the user which tell the disk drive where and how to access the data. The DOS also keeps track of general housekeeping of the disk, such as making sure that files don't overwrite each other. To change the logical organization of the disk, all you need to do is write your own custom DOS which emulates the format of the foreign disk you are trying to access.

Fortunately, most DOS's, including Commodore DOS, CP/M and MS-DOS, have commands which allow you to randomly access individual tracks and sectors on a disk. The trick to format conversion is to use the built-in DOS commands of one format (usually the more complicated one) to read or write another (usually the simpler one) sector by sector. Of course, this requires detailed knowledge of the logical structure of the foreign disk format.

The structure of Commodore DOS disks should be fairly familiar to most 128 users. Since Super Sweep 128 runs on the 128 in native mode, detailed knowledge of Commodore DOS is not required because its functions are implemented automatically. However, detailed information can be found in the user's manual for the 1541 or 1571 drive, if desired. On the other hand, CP/M and MS-DOS disk structures may not be as familiar.

128 CP/M

Single-sided CP/M disks, 128 included, are usually divided into 1K byte areas called blocks or allocation units (AU's). The AU is the smallest space on the disk that a file can occupy. For example, even if a file contained only one byte, the other 1,023 bytes in its AU cannot be used by another file. The 128 single-sided disk contains 170 AU's, numbered 0 to 169. AUs 0 and 1 contain the directory, while the rest are used for data storage. Each AU is subdivided into 8 "records" of 128 bytes each. The record is the standard unit for finding or storing data on a disk within a CP/M file. As files grow, they contain more records, and consequently more blocks are allocated from the list of empty blocks.

Since the standard Commodore GCR sector size used on the 1541 and 1571 disk drives is 256 bytes, each CP/M AU is comprised of four physical sectors on the disk. The actual structure of the 128 CP/M disk is the same as a standard Commodore DOS disk in terms of number of sectors per track and number of tracks per disk. The order in which the sectors are filled, however, is quite different. It is easiest to visualize the filling order if you think of each track as a dartboard with the segments numbered in consecutive order from 0 up to the maximum number of sectors on that track. The sectors are filled starting at 0 and jumping 5 each time to the next; that is 0, 5, 10, 15, and so on. When you complete the circle once, you should have gone past the 0.

For 21 sectors per track, you will end up at sector 4. The cycle then repeats: 4, 9, 14, 19, 3, 8, 13, 18, and so on, until all the sectors on the track have been used and it jumps to sector 0 of the next track. Track 1, sectors 0 and 5 as well as track 18, sector 0 are reserved for special system functions and are not included in the sector-filling sequence table.

Double-sided 128 CP/M disks have an allocation unit size of 2K bytes or 8 physical sectors or 16 records. All of side 0 is filled first, then side 1 in the same order. Track 36 sectors 0 and 5 and track 53, sector 0 (corresponding to the unused sectors on side 0) are not used on side 1.

The 128 CP/M directory starts at "logical" sector 0 (side 0, track 1, sector 10) and continues for two allocation units. (128 CP/M accesses a disk sector by its "logical" number, which refers to its position in the filling sequence table.) For single-sided disks this is equivalent to 8 physical sectors, for double-sided disks, it is 16 physical sectors. Each directory entry follows the standard CP/M 32-byte format as outlined below.

Byte	*Meaning*
0	Reserved, 0 for a good file, hex $e5 for scratched file or empty entry
1-8	Filename in ASCII capitals, padded with ASCII spaces
9-11	File type in ASCII capitals
12	Directory extent
15	Number of 128 byte records in this extent (maximum hex $80)
16-31	File allocation table (numbers of logical AUs used by file, unused locations set to 0)

CP/M filenames consist of two parts: a 1 to 8 character primary name and an optional 0 to 3 character secondary name, usually called a file type. The file type generally is a standard combination of three characters, such as BAS for a BASIC program source code, COM for an executable machine-language program, or TXT or DOS for a text file. In directory listings and documentation, the two parts of the filename are usually separated by a period in the form of "FILE NAME.EXT". Note, however, that the period is not included in the actual directory entry on the disk. If either the primary filename or the file type contains less than the maximum number of characters, the extra locations in the directory entry are padded with ASCII space characters (CHR$(32)). For example, the bytes representing the name "FILE.1" would appear in a directory entry as (decimal values):

```
70  73  76  69  32  32
32  32  49  32  32
F I L E (4 spaces)    1 (2 spaces)
```

The actual location of the data in a file is recorded by the entries in the file allocation table. The value of each entry represents an allocation unit number which contains the next part of the file. The entries in the table need not be in consecutive order, and often will not be on a frequently used disk with many scratched files. Unused locations in the file allocation table for each directory entry are padded with 0 bytes. The physical sectors corresponding to the allocation units can be determined from the entries in the calculated sector fill table, keeping in mind that for a single-sided disk each AU is four disk sectors and a double-sided AU is eight sectors.

For single-sided disks, the maximum number of records per directory entry is 128 (16 allocation units x 8 records per AU). This may also appear to put an upper limit on the file size of 16K bytes. Fortunately, CP/M has a way around this problem. For file sizes larger than 128 records, additional directory entries are created with the same filename by with a different directory "extent" number (byte 12). The extent starts at 0 for a given file and will increase by 1 for each added extent of the same file. The extents need not occupy consecutive entries in the directory.

The allocation table for double-sided disk entries can hold up to 256 records (16 allocation units by 16 records per AU). This is handled by dividing the entry up into two logical extents of 128 records each. For example, a double-sided entry with a record count of 127 will have an extent byte of 0. If two more records are added to the file, the extent byte of the same entry will be changed to 1 and the record count will be 1. (1 extent of 128 records + 1 additional record = 129 records). Thus, files up to

32k bytes long can be addressed by each double-sided directory entry.

The total disk capacity is 170K bytes for a single-sided disk (340K bytes for a double-sided disk) of which 160K (336K for double-sided) is available for data storage. The maximum number of entries in the directory area is 64 for a single-sided disk or 128 for a double-sided disk. Scratched or unused entries are signified by a value of hex $e5 (dec 229) for byte 0. CP/M starts filling the disk with data in consecutive allocation units starting at AU number 2. As files become scratched, their space on the directory and in the data area are made available for other files. Thus, files can become scattered throughout the disk. The only link to recover these files is that provided by the allocation table in the directory.

MS-DOS

MS-DOS and IBM PC-DOS are perhaps the most common operating system used in business computers. MS-DOS compatibility is a hot topic among computer manufacturers these days. Commodore currently offers the MS-DOS-based PC-10-1 and PC-20-2 computers. The Amiga offers MS-DOS compatibility via a software emulation program and/or hardware adaptors. Other manufacturers which previously marketed their own operating systems (such as Radio Shack) are switching to hardware compatible machines.

The most common MS-DOS 5¼-inch disk format is 512 bytes per sector, 40 tracks per side, double-sided, 9 sectors per track (version 2.0 or later). The tracks are numbered 0 to 39 on each side and the sectors are numbered 1 to 9 on each track. The total disk capacity is 360K bytes, of which 354K is available for data storage. The disk is organized into 720 logical sectors numbered 0 to 719, each corresponding to 1 physical sector on the disk. The logical sectors are used as follows:

Logical sector #	*Use*
0	Boot record
1-2	First copy of file allocation table
3-4	Second copy of file allocation table
5-11	Directory
12-719	Data

The boot record is used by MS-DOS to distinguish between the various MS-DOS disk formats and to let the machine know if the disk contains the DOS boot programs, which are normally hidden from the user in the directory.

The file allocation table (FAT) is similar in function to the Commodore BAM. In addition, it also contains the links between different pieces of the same file. The first byte of the FAT table is called a "media descriptor" byte. For a double-sided, 9 sector per track format, it has a value of hex $1d. Other byte values are used to describe other MS-DOS formats (that it, single-sided, 8 sectors per track, and so on). The remaining bytes map out 354 entries, each corresponding to one AU or "cluster" of two adjacent logical sectors. Each FAT entry is 12 bits (1 1/2 bytes) long with two entries coded into three bytes. The FAT value of an unallocated cluster is 0. An allocated cluster entry contains the number of the next cluster in the file. The last cluster in a file has an entry of 409 (hex $fff).

It should be noted that since there are an odd number of sectors per track, the next "adjacent" logical sector may in fact be on a different track and/or side of the disk. A new disk with no scratched files is filled alternately between side 0 and side 1 for each track, with sectors on a given track filled in consecutive order. All of side 0, track 0 is filled, then side 1, track 0, then side 0, track 1, etc., ending up with side 1, track 39. New files written to a disk with many previously scratched files will usually end up in bits and pieces scattered all over the disk as the scratched file space is recovered for reuse. Two copies of the FAT are stored for later comparison during disk reads and writes to ensure that the disk has not been damaged or corrupted.

The MS-DOS directory entries are 32 bytes long, with one entry per file. Up to 112 entries can be made in the main (or root) directory, with more entries in sub-directories. The sub-directories are stored in various locations on the disk as files, but with the "attribute" byte set to a value indicating "sub-directory" in the main directory entry. There is no limit, other than available disk space, on the number of sub-directories. Sub-sub-directories are also permitted, to several nested levels. The significance of the directory bytes are as follows.

Byte	*Meaning*
0-7	Filename, special values for byte 0; a value of 0 indicates unused entry, $e5 indicates a scratched file
8-10	File type
11	File attribute (hidden file, system file, volume label, sub-directory, etc.)
12-21	Reserved by DOS
22-25	Time and date stamp
26-27	Starting cluster number: low byte, high byte
28-29	Low order part of file size: low, high byte
30-31	High order part of file size: low, high byte

The filename and file type are handled in the same manner as CP/M. That is, 8 characters for the file name and 3 for the file type, with unused locations padded with ASCII spaces. MS-DOS incorporates automatic time and date stamping of directory entries. The stamps are read from the system time of day (TOD) clock and are coded in a fairly complex fashion into the directory entry. The MS-DOS directory entry incorporates elements found in both Commodore DOS and CP/M. Similar to Commodore DOS, each directory entry contains the starting location only of the file and the file length. The file size is a 32-bit number giving the number of bytes in the file, thus allowing very large files. In practice, the maximum file size is limited by the capacity of the disk long before this size is reached. Similar to CP/M, links to subsequent parts of a file are stored in a file allocation table. In MS-DOS, however, the FAT is separate from the directory.

Super Sweep 128

Based on knowledge of various disk formats, I have written several file conversion programs to run on an IBM-PC (MS-DOS <> CP/M-86) and a 128 (SEQ <> CP/M). The most powerful one to date is Super Sweep 128, a conversion program for the 128 with a 1571 drive which can handle SEQ, C128 CP/M (SS and DS) and MS-DOS file conversions.

Super Sweep 128 is an easy to use BASIC 7.0 program for the 128 with one or two disk drives and an 80-column display monitor. The program is roughly modeled on the popular CP/M file copy utility "SWEEP.COM", but with a major difference: It can read/write/translate files from/to any one of the following five disk formats:

SEQ-ASCII

SEQ-with PETSCII <> ASCII conversion

C128 CP/M single-sided
C128 CP/M double-sided
MS-DOS double-sided, 9 sectors/track

With Super Sweep 128, the selection of source and target file types are totally independent—they can be the same or different in any combination. For CP/M and MS-DOS files, at least one of the disk drives must be a 1571. Of course, a 1541 (or compatible) can be used to read or write SEQ files. One word of caution, however. Because the 1571 is not a true MS-DOS disk drive, never write MS-DOS files to an original, irreplaceable disk. Play it safe and always use scratch disks for writing files. (Although I have had no problems with disks from three different IBM-PCs and four PC-compatibles, the possibility does exist for mis-matched sector timing and things like that. This could corrupt the disk being written to.)

Listing 1 is a BASIC loader for the machine-language portion of the program. You will only have to run this program once. It creates a program file named "SS.ML1" which is automatically loaded by the main program each time it is run. The machine-language routine, which is located in the cassette and RS 232 buffers, contains several entry points.

Address hex	dec	*Function*
0b00	2816	Analyze disk format
0b69	2921	Burst sector read (for CP/M and MS-DOS)
0b9a	2970	Read SEQ, no convert
0bcd	3021	Write SEQ, no convert
0bfb	3067	Burst sector write (for CP/M and MS-DOS)
0c71	3185	Write SEQ, convert ASCII to PETSCII
0cd4	3284	Read SEQ file, convert PETSCII to ASCII
0d5c	3420	Fill to end of sector with spaces

If you are interested, you can disassemble the machine language with the 128's built-in monitor command. Super Sweep 128 uses burst mode on the 1571 to read and write MS-DOS and CP/M files. Consequently, it is quite fast. (A detailed description of 1571 burst mode and how to use it will be presented next month in this magazine.) A typical conversion of a 30K byte (120 SEQ block) text file from MS-DOS to SEQ-PETSCII takes about two minutes, including about 25 seconds of "overhead" required to decode the MS-DOS directory and file allocation table.

Listing 2 is the main BASIC program. As you can see, there are no REM statements in the body of the program. In trying to maximize the available buffer space for file transfers, I chose to leave them out. The following table summarizes its main parts.

Line	*Function*
10	Check 80-column screen on
20	Clear screen, load machine language, GOTO main menu
30-60	Error routines
70-110	Burst mode read and write subroutines
120-140	Log in disks
150-200	Screen display subroutines
210-240	Set default parameter values
250-350	Main menu and source/target selections
360-400	Calculate CP/M sector sequence table
410-620	Read source disk directory
630-720	Select files to copy
730-830	Copy files
840-860	Read SEQ file
870-880	Write SEQ file
890-920	Read CP/M file
930-1100	Write CP/M file
1110-1150	Read MS-DOS file
1160-1270	Write MS-DOS file
1280	Quit

You may have noticed that most of the frequently called subroutines are at the beginning of the program. This helps to speed up the execution of the program. BASIC 7.0 searches for line numbers to GOTO or GOSUB starting at the beginning of a program. Therefore, in a long program, a GOSUB10 would execute faster than a GOSUB1000 because line 10 occurs sooner than line 1000.

Super Sweep 128 is simple to use—just follow the prompts on the screen. Type in and save a copy of both Listing 1 and Listing 2. When you run Super Sweep 128, make certain that the disk with the "SS.ML1" file created by Listing 1 is in disk drive unit 8. (Once the file type selection menu appears on the screen, you can remove the SS.ML1 disk from the drive.) Also make sure that you have an 80-column display monitor connected.

The prompts on the screen will ask you to enter the file type and disk drive unit number for both source and target files. (The source file is the one being copied from, while the target is the one being copied to.) The program will then check to see that the requested drives are turned on and are capable of handling the selected file type. If an error is detected, you will be asked to re-select your drive and file type. If either source or target file type was selected as CP/M, the program will then calculate the CP/M logical sector fill table as outlined previously.

Once all of the preliminaries have been taken care of, you will be prompted to insert the source disk. The program will then take a few moments to read in the disk directory and enter the file names into array N$( ). The next step is to select the files you want to copy. Super Sweep 128 is capable of copying a group of one or more files at a time in a batch. As each filename is displayed, you are given the option of pressing a number of special keys. These keys, which are also summarized on the display screen, consist of:

T : tag a file for copying
U : untag a file
N : (or any other key not listed) advance to next file
C : start copying tagged files
R : go back to the file type and drive selection menu
Q : (Or <ESC>) quit

Scroll through the list of files and mark the ones you want to copy with the T key. After tagging each file, you will be given the option to alter the filename for the target file. Press RETURN if you want to keep the same name as the source file or enter a new name. This feature allows you to adjust the filename to suit the different format of CP/M and MS-DOS and SEQ type directory entries. When transferring from SEQ to either CP/M or MS-DOS, you should take care that the filename does not contain any periods and is a maximum of 11 characters long. When transferring to SEQ from either CP/M or MS-DOS, you can remove any extra spaces in the filename that are caused by a filename with less than the maximum number of characters. Once the last file has been displayed, the list will cycle back to the first file in the directory. You can then tag some more files or un-tag some previously tagged ones.

Once you have chosen all the files for copying, press the C key to start the copying process. You will then be prompted to insert the target disk, and the process begins. If you are lucky

enough to have two disk drives, you can sit back and relax because no disk-swapping will be required. If you are using a single drive, you will be prompted to swap disks at the correct time. It is a good idea to cover the write-protect notch on the source disk if you are doing a lot of swapping to prevent accidentally writing to the wrong disk. It is also important that you complete the entire copying process when the target file type is either CP/M or MS-DOS, because the updated directory is only written to the target disk after ALL files have been copied. (SEQ type disk directories are updated automatically after each file has been copied.)

Super Sweep 128 contains numerous error detection and correction routines. However, just to be safe, always double-check that you have the correct disk in the correct drive before proceeding from a prompt. In addition, never remove a disk from a drive without first being prompted to insert another one. Super Sweep 128 does not check for duplicate filenames when writing to CP/M and MS-DOS disks, so be careful when writing to these disks.

The maximum file size that can be transferred in any direction is 40K bytes. Longer files will be truncated to this length. This is equivalent to 160 SEQ blocks or nearly three full CP/M directory extents, and is a very long program or text file. All files in memory are assumed to be in ASCII format. SEQ PET files read from disk are assumed to be PETSCII on the disk and are translated to ASCII as they are read in. SEQ PET files written to disk are assumed to be ASCII in memory and are converted to PETSCII as they are written to disk. All other transfers are done in a binary what-you-see-is-what-you-get fashion.

When reading the MS-DOS directory, Super Sweep 128 ignores the file attribute (byte 11), except for the volume label and subdirectory attributes which do not represent valid files. This lets you display and access hidden and system files which do not show up on an MS-DOS DIR directory command. Super Sweep 128 sets directory bytes 11-25 and 30-31 to 0 when it is writing a new file. This is easier than trying to calculate a file creation time, date, attribute, and so on. Zero bytes in these locations are accepted by MS-DOS.

Super Sweep 128 will recover unused and scratched directory and data space for both CP/M and MS-DOS disks. This is handled automatically by Commodore DOS when writing to SEQ files.

File Transfer Tips

Super Sweep can be used for simple ASCII <> PETSCII conversion of SEQ files with either a 1571 or 1541 (or other compatible) drive in the following manner.

PETSCII to ASCII — source file type = SEQ PET
target file type = SEQ ASCII
ASCII to PETSCII — source file type = SEQ ASCII
target file type = SEQ PET

One word of caution for PETSCII <> ASCII conversions. Super Sweep 128 strips out control codes (ASCII value less than 32) and certain other special codes in both directions. It also adds a linefeed character (ASCII CHR$(10)) after each carriage return when converting to ASCII and removes all linefeeds when converting to PETSCII. The presence of these codes in, for example, text formatted on a CP/M word processor may require the text to be reformatted with a 128 word processor before it can be used in 128 mode. In addition, documents originally written or edited with some word processors (such as *WordStar*—either CP/M or MS-DOS version) should be handled in non-document mode (standard ASCII) on these word processors if they are intended to be subsequently used in 128 mode. *WordStar* sets the high bit of the last character of each word in document mode. This results in an incorrect ASCII to PETSCII conversion.

Super Sweep 128 is designed mainly for transferring text and data files. This brings up a general caveat. Program files written to run under MS-DOS (with a file type of .EXE or .COM) will not work on the 128 or on a CP/M machine (the CP/M executable file also has a file type of .COM, but the two are not interchangeable) or vice versa. However, CP/M programs for one machine, such as the TRS-80, will usually work without change on another CP/M machine such as the 128 in CP/M mode. In addition, if you download a CP/M program to an MS-DOS disk and then convert the file to CP/M format, the program will work in CP/M mode on the 128. This is useful, for example, if you do not have a modem on your 128 but have access to one on an MS-DOS computer elsewhere. The same goes for downloading to SEQ format in 128 mode and then converting to CP/M format. (The original version of 128 CP/M did not support a modem. The upgraded version now does.)

BASIC source code programs are often interchangeable between MS-DOS and CP/M, if they have been saved in ASCII format (not tokenized form) and do not contain advanced features specific to one or the other machine, such as graphics or sound. MS-DOS BASIC (i.e., GW-BASIC or IBM BASIC) and 128 BASIC 7.0 are actually extended versions of the original Microsoft MBASIC used on most CP/M machines. BASIC source code listings produced as text files on Commodore computers can often be used on CP/M and MS-DOS machines (and vice versa) with only minor editing to reflect different syntax of some commands.

To transfer the listings from one machine to another, the program must be first saved as an ASCII text file on the original machine. (The tokenized programs for the various BASICs are not compatible in either format or keyword tokens.) In MS-DOS and CP/M BASIC, this is done by appending an "A" to the end of the SAVE command:

```
SAVE "filename",A
```

In 128 BASIC 7.0, it is done by listing the program to a disk file:

```
OPEN 8,8,8,"0:filename,s,w"
CMD8:LIST
PRINT#8:CLOSE8
```

Non-standard character codes embedded in program text (such as color codes, reverse video and cursor controls) should be edited out, either before or after conversion, because they may cause MS-DOS and CP/M BASICs to behave in odd manners. To load an ASCII file with MS-DOS or CP/M BASIC, the normal LOAD"filename" command is used. A SEQ text file can also be loaded as a program on the 128. This is done in the following manner (many thanks to colleague Jim Butterfield for demonstrating this trick to me).

```
DOPEN #1,"filename"
SYS 65478,0,1
DCLOSE
```

Incidentally, this is no magical ROM routine, but the standard KERNAL "CHKIN" function at hex $FFC6 which has been enhanced on the 128.

The file to be read in should be saved

as a SEQ-ASCII file with Super Sweep 128. This routine reads in the text file listing and converts it to a program, just as if you had entered each line directly from the keyboard. Because of this, it will merge with, but not erase any program lines currently in memory. It can, therefore, also be used to merge two or more 128 programs. You may get a syntax error or out of data message after the program listing has been read in. This is caused by any extraneous text which may be included at the end of the listing file. Normally, however, it has no effect on the loading on the program.

The format of the BASIC source code is important for files to be used with MS-DOS or CP/M BASIC. 128 BASIC 7.0 does not require spaces between keywords and arguments, while both MS-DOS and CP/M BASICs do. For example, the statement 10 FORI=1TO10 is legitimate in BASIC 7.0. For MS-DOS and CP/M BASIC it must be changed to 10 FOR I=1 TO 10.

It is also important to remember that the number of significant characters in BASIC 7.0 variable names is limited to two, while both MS-DOS and CP/M BASICs have no such restriction. VARIABLE1 and VALUE2 are distinct variable names in MS-DOS and CP/M BASICs, while in BASIC 7.0, they are both equivalent to "VA".

Although it is not an MS-DOS emulator, you will find Super Sweep 128 an invaluable utility for transferring files from one machine to another (and between modes on the 128 also) if you use both an MS-DOS computer and a 128. It is also possible, with a little detailed knowledge of the disk formats, to use the same principles for transferring files to/from other computers and operating systems that use MFM type disks, such as TRS-DOS used on the Radio Shack computers or possibly RS CoCo OS/9 disks to PET OS/9 format. ■

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

Listing 1

```
10 PRINT"[CLEAR]CREATING MACHINE
   LANGUAGE PORTION OF"'BATI
20 PRINT"[DOWN2,SPACE9]
   SUPER SWEEP 128"'BAND
30 PRINT"[DOWN2,SPACE15]BY"'BAFC
40 PRINT"[DOWN,SPACE9]M.
   GARAMSZEGHY"'BAEF
50 SU=0:FOR I=2816 TO 3445:READ X
   :POKE I,X:SU=SU+X:NEXT'JBDN
60 IF SU<> 84362 THEN PRINT"[DOWN2,
   RVS]ERROR IN DATA STATEMENTS!!"
   :END'GIWO
70 BSAVE"SS.ML1",B0,P2816 TO P3445
   :PRINT"--> DONE <--":END'ERON
100 DATA 133,251,160,0,132,250,140,0,
    255,120,44,13,220,32,93,11'BERF
110 DATA 32,61,11,201,2,144,27,41,14,
    201,0,208,21,32,61,11'BYUF
120 DATA 41,14,201,0,208,17,32,61,11,
    32,61,11,32,61,11,32'BXXG
130 DATA 61,11,88,32,204,255,96,142,1,
    19,76,50,11,169,8,44'BYBH
140 DATA 13,220,240,251,173,0,221,73,
    16,141,0,221,173,12,220,162'BFSJ
150 DATA 63,142,0,255,145,250,162,0,
    142,0,255,200,96,173,0,221'BDKK
160 DATA 73,16,141,0,221,173,12,220,
    96,133,252,134,250,132,251,
    160'BHDM
170 DATA 0,140,0,255,120,44,13,220,32,
    93,11,32,61,11,41,14'BYWL
180 DATA 201,0,208,20,160,0,32,61,11,
    192,0,208,249,166,252,202'BDDN
190 DATA 134,252,230,251,224,0,208,
    238,88,96,133,251,169,0,141,0'BFYP
200 DATA 255,133,250,32,198,255,160,0,
    32,207,255,162,63,142,0,255'BGXH
210 DATA 145,250,162,0,142,0,255,32,
    183,255,208,12,200,208,233,
    230'BHCI
220 DATA 251,173,0,19,197,251,208,224,
    132,250,76,204,255,133,251,
    132'BJXJ
230 DATA 252,160,0,132,250,140,0,255,
    32,201,255,160,0,162,63,142'BFXJ
240 DATA 0,255,177,250,162,0,142,0,
    255,32,210,255,200,208,238,
    230'BGEL
250 DATA 251,165,252,197,251,208,230,
    32,204,255,96,133,254,132,251,
    160'BLWN
260 DATA 0,132,250,140,0,255,162,64,
    134,252,120,160,0,56,32,71'BDEM
270 DATA 255,173,0,221,205,0,221,208,
    248,69,252,41,64,240,242,162'BGSO
280 DATA 63,142,0,255,177,250,162,0,
    142,0,255,141,12,220,165,252'BFHP
290 DATA 73,64,133,252,169,8,44,13,
    220,240,251,200,208,211,166,
    254'BHUQ
300 DATA 202,134,254,230,251,224,0,
    208,200,24,32,71,255,44,13,
    220'BGUI
310 DATA 173,0,221,9,16,141,0,221,169,
    8,44,13,220,240,251,173'BCOI
320 DATA 12,220,133,255,173,0,221,41,
    239,141,0,221,88,32,204,255'BFGK
330 DATA 96,132,252,133,251,169,0,133,
    250,141,0,255,32,201,255,160'BHKL
340 DATA 0,162,63,142,0,255,177,250,
    162,0,142,0,255,133,254,201'BEKL
350 DATA 13,240,40,165,254,201,31,144,
    37,201,64,240,30,41,192,201'BGWN
360 DATA 0,240,22,165,254,41,32,201,0,
    208,7,165,254,9,128,76'BBCN
370 DATA 187,12,165,254,41,95,76,187,
    12,165,254,32,210,255,200,192'BHPP
380 DATA 0,208,190,230,251,166,251,
    228,252,208,182,32,204,255,96,
    169'BJLQ
390 DATA 0,76,187,12,133,251,169,0,
    133,250,141,0,255,32,198,255'BEHQ
400 DATA 160,0,76,234,12,32,183,255,
    208,86,32,207,255,133,254,201'BGYJ
```

```
410 DATA 13,208,30,162,63,142,0,255,
    145,250,162,0,142,0,255,200'BEDJ
420 DATA 192,0,208,8,230,251,169,254,
    197,251,240,52,169,10,76,39'BFTL
430 DATA 13,201,64,240,18,41,192,201,
    0,240,8,165,254,41,128,201'BEKL
440 DATA 0,240,35,165,254,41,127,162,
    63,142,0,255,145,250,162,0'BERM
450 DATA 142,0,255,200,192,0,208,173,
    230,251,165,251,201,254,208,
    165'BJJO
460 DATA 132,250,32,204,255,96,165,
    254,41,32,201,0,208,7,165,254'BFWP
470 DATA 9,32,76,39,13,165,254,41,95,
    76,39,13,133,251,134,250'BCAP
480 DATA 162,63,142,0,255,160,0,169,
    32,145,250,200,208,251,162,0'BFGR
490 DATA 142,0,255,96,0,0'BQTK
```

END

Listing 2

```
10 IF RGR(0)<>5 THEN PRINT"[CLEAR,RVS]
   SWITCH TO 80 COL[DOWN]"
   :PRINT"THEN TYPE RUN":END'IGFL
20 TRAP 30:WINDOW 0,0,79,24,1
   :BLOAD"SS.ML*",B0,P2816:GRAPHIC CLR
   :FAST:GOTO 210'HISL
30 PRINT ERR$(ER):GOSUB 190'DIFC
40 IF EL=20 THEN RESUME 20'EGPE
50 IF ER=5 AND EL=130 THEN A$="R"
   :RESUME 700'HOUJ
60 IF ER=4 THEN RESUME 820
   :ELSE RESUME 630'GKGI
70 SA=SA(3):SE=1:ZS=0:FOR DZ=Z1 TO Z2
   :PRINT#F,"U0@"+CHR$(T(DZ))+CHR$(S
   (DZ))+CHR$(1)+CHR$(T(DZ)):GOSUB 90
   :NEXT:DM=AD+256:RETURN'UMVG
80 SA=TA(3):SE=2:PRINT#3,
   "U0"+CHR$(B1+2)+CHR$(TR)+CHR$(DZ)
   +CHR$(1)+CHR$(TR)'OJBW
90 AD=DM+ZS*256*SE:IF AD>=TP THEN
   RETURN:ELSE SYS(SA),SE,0,AD/256
   :ZS=ZS+1:RETURN'POYY
100 SA=SA(3):SE=2:PRINT#F,
    "U0"+CHR$(B1)+CHR$(TR)+CHR$(DZ)
    +CHR$(1)+CHR$(TR):GOTO 90'OLXN
110 SA=TA(3):SE=1:ZS=0:FOR DZ=Z1 TO Z2
    :PRINT#3,"U0B"+CHR$(T(DZ))+CHR$(S
    (DZ))+CHR$(1)+CHR$(T(DZ)):GOSUB 90
    :NEXT:DM=AD+256:RETURN'UMFY
120 PRINT TAB(20)"[DOWN6]
    INSERT "TY$(XF)" DISK IN UNIT #"D
    :PRINT TAB(22);:GOTO 190'FUSK
130 CLOSE F:POKE 2588,0
    :OPEN F,D,15,"U0":Q=PEEK(2588)AND
    64:IF Q=64 OR XF<3 THEN
    RETURN'MICN
140 PRINT"[CLEAR,DOWN3,SPACE3]
    "TY$(XF)" DISK REQUIRES A 1571
    DRIVE":GOSUB 190:A$="R"
    :GOTO 700'ESJN
150 WINDOW 3,3,77,19,1:RETURN'CNED
160 WINDOW 0,21,79,24,1:RETURN'COQF
170 WINDOW 3,9,74,19,1:RETURN'CNCG
180 WINDOW 50,9,77,19,1
    :PRINT" ENTER[SPACE4]FOR[DOWN]"
    :FOR I=1 TO 5:PRINT I"-->[SPACE2]
    "TY$(I):NEXT:WINDOW 3,9,45,19,1
    :RETURN'JQTV
190 POKE 208,0:PRINT FO$"[DOWN]
    ** PRESS A KEY TO CONTINUE **"FF$
    :GET KEY A$:RETURN'FQZS
200 BANK 0:F3$="":FOR J=1 TO 11
    :F3$=F3$+CHR$(PEEK(Y+J)):NEXT
    :RETURN'MBOJ
210 PB=PEEK(4625)*256+256:CB=PB+5120
    :BU=CB+5120:TP=65023
    :POKE 4864,TP/256'LBWP
220 FO$=CHR$(15):FF$=CHR$(143):SD=8
    :TD=9:SF=1:TF=2:CF=0
    :BL$="[SPACE15]"'KPLQ
230 DIM T(1360),S(1360),ES(16),FA(2,
    361),SM(36),N$(144),NT$(144),
    NI(144),TY$(5)'BVHO
240 SA(1)=2970:SA(2)=3284:SA(3)=2921
    :TA(1)=3021:TA(2)=3185
    :TA(3)=3067'GJDQ
250 PRINT"[CLEAR]"TAB(32)"SUPER SWEEP
    128":PRINT TAB(31)"BY M.
    GARAMSZEGHY"'EHDO
260 PRINT" [CMDR A]";:FOR I=1 TO 76
    :PRINT"[SHFT *]";:NEXT
    :PRINT"[CMDR S]";:FOR I=3 TO 19
    :CHAR,1,I,"[SHFT -]"
    :CHAR,78,I,"[SHFT -]":NEXT'NFSU
270 PRINT"[SPACE2,CMDR Z]";
    :FOR I=1 TO 76:PRINT"[SHFT *]";
    :NEXT:PRINT"[CMDR X]";'HLRM
280 TY$(1)="SEQ ASCII":TY$(2)="SEQ
    PET[SPACE2]":TY$(3)="CP/M SS
    [SPACE2]":TY$(4)="CP/M DS[SPACE2]"
    :TY$(5)="MS-DOS DS"'FJKB
290 GOSUB 150:PRINT"[CLEAR,DOWN]
    ENTER SOURCE DRIVE CHARACTERISTICS
    :"'CEVR
300 GOSUB 180:PRINT"FILE TYPE[SPACE4]
    "SF"[LEFT4]";:INPUT SF'DKQG
310 GOSUB 170:PRINT"UNIT #[SPACE2]
    "SD"[LEFT4]";:INPUT SD:XF=SF:D=SD
    :F=1:GOSUB 130'HBIN
320 GOSUB 150:PRINT"[CLEAR,DOWN]
    ENTER TARGET DRIVE CHARACTERISTICS
    :"'CELL
330 GOSUB 180:PRINT"FILE TYPE[SPACE4]
    "TF"[LEFT4]";:INPUT TF'DKSJ
340 GOSUB 170:PRINT"UNIT #[SPACE2]
    "TD"[LEFT4]";:INPUT TD:XF=TF:D=TD
    :F=2:GOSUB 130:GOSUB 150'IFFR
350 DCLOSE U(SD):DCLOSE U(TD)
    :IF CF=0 AND(SF=3 OR SF=4 OR TF=3
    OR TF=4)THEN CF=1:ELSE 410'PNSV
360 CHAR,19,10,FO$+"** INITIALIZING
    CP/M SECTOR TABLE **"+FF$'DNLR
370 FOR I=1 TO 17:SM(I)=20:NEXT
```

```
    :FOR I=18 TO 24:SM(I)=18:NEXT
    :FOR I=25 TO 30:SM(I)=17:NEXT
    :FOR I=31 TO 35:SM(I)=16:NEXT'UICE
380 T=1:S=10:TC=2:FOR I=0 TO 679
    :T(I)=T:T(I+680)=T+35:S(I)=S
    :S(I+680)=S:S=S+5:TC=TC+1
    :IF S>SM(T)THEN S=S-SM(T)-1'XXFN
390 IF TC>SM(T)THEN T=T+1:S=0:TC=0
    :IF T=18 THEN S=5:TC=1'MCWU
400 NEXT:GOSUB 150'CEWY
410 XF=SF:D=SD:F=2:GOSUB 120:GOSUB 130
    :GOSUB 150:DR=0:F1=1
    :IF SF=4 THEN F1=2'MNCP
420 CHAR,22,10,FO$+"** READING SOURCE
    DIRECTORY **"+FF$:FI=1:DK=PB'FWVQ
430 FA=F1:MX=0:ON SF GOSUB 440,440,
    510,510,540:GOTO 630'FJXL
440 PRINT#2,"I0":OPEN 1,SD,0,"$0:*=S"
    :IF DS THEN 500:ELSE SYS SA(1),
    PB/256,1'HFLO
450 M=PEEK(250)+PEEK(251)*256:BANK 0
    :FOR I=PB+32 TO M-32 STEP 32
    :MX=MX+1'OJOU
460 FOR J=3 TO 16:IF PEEK(I+J)<>34
    THEN NEXT'KLUM
470 N$(MX)="":FOR K=J+1 TO 32
    :A=PEEK(I+K):IF A=34 THEN 490'LAYR
480 N$(MX)=N$(MX)+CHR$(A):NEXT K'EROM
490 NI(MX)=0:NEXT I:DCLOSE U(SD)
    :RETURN'ERQN
500 PRINT DS$:CLOSE 1:GOSUB 190
    :GOTO 440'ENBE
510 GOSUB 535:DM=DK:Z1=0:Z2=8*FA-1
    :GOSUB 70:IF DR THEN RETURN'KAOM
520 FOR Y=PB TO DM-1 STEP 32
    :IF PEEK(Y)<>229 AND
    PEEK(Y+12)<F1 THEN GOSUB 200
    :MX=MX+1:NI(MX)=0:N$(MX)=F3$'TYYA
530 NEXT:RETURN'CBXD
535 PRINT#F,"U0"+CHR$(10):RETURN'EHXL
540 GOSUB 535:SYS 2816,DK/256
    :IF(PEEK(DK)AND 160)<>160 OR
    PEEK(DK+2)<>9 THEN 620'OLST
550 ZS=0:DM=DK:B1=64:TR=0
    :FOR DZ=6 TO 9:GOSUB 100:NEXT'JCMQ
560 B1=80:FOR DZ=1 TO 3:GOSUB 100:NEXT
    :DM=AD+512:IF DR THEN 590'KDBR
570 FOR I=PB TO DM-1 STEP 32
    :IF PEEK(I)=0 THEN 590
    :ELSE IF PEEK(I)<>229 AND
    PEEK(I+11)<>8 THEN Y=I-1:GOSUB 200
    :MX=MX+1:NI(MX)=0:N$(MX)=F3$'CKYM
580 NEXT'BAEH
590 ZS=0:DM=DM+256:B1=64:TR=0:ZS=0
    :FOR DZ=2 TO 3:GOSUB 100:NEXT
    :DM=AD+512:BANK 0:FOR I=0 TO 360
    :P=DK+3840+INT(1.5*I)'WPXM
600 IF I AND 1 THEN FA(FI,
    I)=PEEK(P+1)*16+INT(PEEK(P)/16)
    :ELSE FA(FI,I)=PEEK(P)+256*(PEEK
    (P+1)AND 15)'TVWW
610 NEXT:RETURN'CBXC
620 PRINT:PRINT"THIS IS NOT AN MS-DOS
    DISK!!":PRINT"[DOWN]
    INSERT CORRECT DISK":GOSUB 190
    :GOTO 540'FKCT
630 GOSUB 160:PRINT"OPTIONS:"
    :PRINT" T --> TAG FILE TO COPY
    [SPACE6]U --> UN-TAG A FILE
    [SPACE10]N --> NEXT FILE"'DFJY
640 PRINT" C --> COPY TAGGED FILES
    [SPACE5]R --> RESET SOURCE/TARGET
    [SPACE4]Q --> QUIT";'BBYU
650 GOSUB 150:PRINT"[DOWN2]
    "TAB(10)TY$(SF)" FILES ON UNIT
    #"SD:GOSUB 170:CO=0'FYMR
660 FOR I=1 TO MX:PRINT I"
    :[SPACE2]"N$(I);:IF NI(I)THEN
    PRINT TAB(30)"--> "NT$(I);'IDRS
670 GET KEY A$:IF A$="C"THEN GOSUB 160
    :GOSUB 150:GOTO 730'IQNP
680 IF A$="T"THEN IF NI(I)=0 THEN
    NI(I)=1:CO=CO+1:NT$(I)=N$(I)
    :INPUT"[SPACE2]--> TARGET FILE
    NAME";NT$(I)'LPDE
690 IF A$="U"THEN IF NI(I)=1 THEN
    NI(I)=0:PRINT"[LEFT15]"BL$;BL$;
    :CO=CO-1'KEKG
700 IF A$="R"THEN GOSUB 160:GOSUB 150
    :GOTO 290'GNWH
710 IF A$="Q"OR A$=CHR$(27)THEN
    1280'GMXI
720 PRINT:NEXT:PRINT:PRINT
    :GOTO 660'FHOH
730 PRINT TAB(10)"[DOWN3]
    COPY >>"CO"FILES: FROM
    >>"TY$(SF)", ON UNIT"SD
    :PRINT TAB(29)"[DOWN]
    TO >>"TY$(TF)", ON UNIT"TD'ECFY
740 PRINT TAB(25);:INPUT"[DOWN2]
    OK <Y/N>";O$:IF O$<>"Y"THEN
    630'HOUO
750 DR=1:DK=CB:FI=2:F2=1:GOSUB 150
    :IF TF=4 THEN F2=2'JCUS
760 FA=F2:XF=TF:D=TD:F=3:GOSUB 120
    :GOSUB 130:GOSUB 170
    :ON TF GOSUB 1150,1150,510,510,
    540'JCLY
770 GOSUB 150:PRINT"[DOWN]COPYING:"
    :GOSUB 170:FG=0:FOR CX=1 TO MX
    :IF NI(CX)=0 THEN 820'KELX
780 FG=1:XF=SF:D=SD:F=2:F$=N$(CX)
    :IF SD=TD THEN GOSUB 120
    :GOSUB 170'KLLY
790 DM=BU:PRINT F$;:ON SF GOSUB 840,
    840,890,890,1080:IF M>TP THEN
    M=TP'INFX
800 DM=BU:XF=TF:D=TD:F=3
    :F$=NT$(CX)+BL$:IF SD=TD THEN
    GOSUB 120:GOSUB 170'LQPT
810 SYS 3420,(M+1)/256,
    M-INT((M+1)/256)*256+1
    :IF M>BU THEN PRINT" --> "F$
    :ON TF GOSUB 870,870,930,930,
    1160'PGMA
```

```
820 NEXT CX:IF FG THEN ON TF GOSUB
    1150,1150,1070,1070,1220'FGVN
830 PRINT"[DOWN2] ---> DONE <---"
    :GOSUB 190:GOTO 630'DIUL
840 OPEN 1,SD,8,"0:"+N$(CX)
    :IF DS=0 THEN 860'FUAO
850 PRINT"[RVS]ERROR >> ";DS$
    :GOSUB 190:CLOSE 1:CLOSE 4
    :GOTO 820'FQVP
860 SYS(SA(SF)),BU/256,1
    :M=PEEK(250)+PEEK(251)*256:CLOSE 1
    :RETURN'JJRV
870 OPEN 4,TD,8,"0:"+NT$(CX)+",S,W"
    :IF DS THEN 850'FUMS
880 SYS(TA(TF)),BU/256,4,M/256+1
    :CLOSE 4:RETURN'GAET
890 GOSUB 535:NB=0:NR=0
    :FOR Y=PB TO PB+F1*2040 STEP 32
    :GOSUB 200:IF F$<>F3$THEN 920'ONOD
900 NR=PEEK(Y+15):NB=PEEK(Y+12)
    :FOR Z=16 TO 31:B=PEEK(Y+Z)'MCAR
910 IF B THEN Z1=B*4*F1:Z2=Z1+4*F1-1
    :GOSUB 70:NEXT'LUQP
920 NEXT Y:M=BU+NR*128+NB*16384
    :RETURN'HSON
930 GOSUB 535:XE=0:FOR JJ=BU TO M-1
    STEP 16384*F2:GOSUB 1000:DM=JJ
    :FOR K=0 TO 15'NLPW
940 Z1=ES(K+1)*4*F2:Z2=Z1+4*F2-1
    :IF JJ+K*1024*F2<M THEN GOSUB 110
    :NEXT:K=16'RODC
950 NR=INT((M-JJ+127)/128)
    :IF F2=1 AND NR>128 THEN NR=128
    :ELSE IF NR>128 THEN 990'PNWB
960 BANK 0:NB=K:DI=CB+32*DF:POKE DI,0
    :FOR I=1 TO 11:POKE DI+I,
    ASC(MID$(F$,I,1)):NEXT'OQKC
970 POKE DI+12,XE:FOR I=13 TO 31
    :POKE DI+I,0:NEXT:FOR I=1 TO NB
    :POKE DI+15+I,ES(I):NEXT'PNBD
980 POKE DI+15,NR:XE=XE+1:NEXT JJ
    :RETURN'GRZT
990 XE=XE+1:NR=NR-128:IF NR>128 THEN
    NR=128:GOTO 960:ELSE 960'KHQB
1000 DF=0:FOR I=0 TO 16:ES(I)=0:NEXT
     :FOR I=2 TO 169:FA(2,I)=0
     :NEXT'LHIG
1010 FOR I=CB TO CB+2040*F2 STEP 32
     :IF PEEK(I)=229 THEN 1030'KYQF
1020 FOR J=16 TO 31:FA(2,PEEK(I+J))=1
     :NEXT:DF=DF+1'JYMG
1030 NEXT:IF DF>64*F2 THEN 1060'FLAB
1040 N=1:FOR I=2 TO 169
     :IF FA(2,I)=0 THEN ES(N)=I
     :FA(2,I)=1:N=N+1:IF N>16 THEN
     RETURN'PPLP
1050 NEXT'BAEX
1060 PRINT"[DOWN2]CP/M DISK FULL"
     :GOSUB 1070:GOSUB 190
     :GOTO 630'ENQH
1070 DM=CB:Z1=0:Z2=8*FA-1:GOSUB 110
     :GOTO 170'HXAJ
1080 GOSUB 535:FOR I=PB TO PB+3580
     STEP 32:IF PEEK(I)=0 OR
     PEEK(I+11)=8 OR PEEK(I+11)=16 OR
     PEEK(I)=229 THEN 1100'VSQY
1090 Y=I-1:GOSUB 200:IF F$=F3$THEN
     1110'GRMJ
1100 NEXT:RETURN'CBXU
1110 BANK 0:ZS=0:SC=PEEK(I+26)+PEEK
     (I+27)*256:M=BU+PEEK(I+28)+PEEK
     (I+29)*256'ROCP
1120 SS=(SC-2)*2+12:GOSUB 1140
     :GOSUB 100:SS=SS+1:GOSUB 1140
     :GOSUB 100'KJCJ
1130 SC=FA(1,SC):IF SC>360 OR SC<6
     THEN RETURN:ELSE 1120'IYNH
1140 SI=INT((SS-INT(SS/18)*18)/9)
     :DZ=SS-INT(SS/9)*9+1
     :TR=INT(SS/18):B1=64
     :IF SI THEN B1=80'UAUX
1150 RETURN'BAQY
1160 GOSUB 535:BANK 0:FOR Y=CB TO
     CB+3580 STEP 32:IF PEEK(Y)=0 OR
     PEEK(Y)=229 THEN 1170:ELSE NEXT
     :GOTO 1270'ROFT
1170 DR=Y:FOR J=10 TO 31:POKE Y+J,0
     :NEXT:NC=5:GOSUB 1260:NC=J
     :LE=M-BU'MJMR
1180 POKE DR+26,NC AND 255
     :POKE DR+27,NC/256
     :FOR DM=BU TO M-1 STEP 1024'LHDQ
1190 ZS=0:SS=(NC-2)*2+12:GOSUB 1140
     :GOSUB 80:SS=SS+1:GOSUB 1140
     :GOSUB 80'LLKS
1200 GOSUB 1260:FA(2,NC)=J:NC=J:NEXT
     :FA(2,NC)=4095:BANK 0
     :FOR J=1 TO 11'JPDJ
1210 POKE DR+J-1,ASC(MID$(F$,J,1))
     :NEXT:POKE DR+28,LE-INT(LE/256)
     *256:POKE DR+29,LE/256
     :RETURN'QVVQ
1220 DM=CB:ZS=0:B1=64:TR=0
     :FOR DZ=6 TO 9:GOSUB 80:NEXT
     :B1=80:FOR DZ=1 TO 3:GOSUB 80
     :NEXT'PPIP
1230 BANK 0:DM=CB+3840:FOR I=0 TO 359
     :P=DM+INT(1.5*I)'KCTK
1240 IF I AND 1 THEN POKE P,((FA(2,
     I)AND 15)*16)OR PEEK(P)
     :POKE P+1,FA(2,I)/16
     :ELSE POKE P,FA(2,I)AND 255
     :POKE P+1,FA(2,I)/256'RMWX
1250 NEXT:ZS=0:B1=64:TR=0
     :FOR DZ=2 TO 3:GOSUB 80:NEXT:ZS=0
     :FOR DZ=4 TO 5:GOSUB 80:NEXT
     :GOTO 170'QOBS
1260 FOR J=NC+1 TO 359:IF FA(2,
     J)THEN NEXT:GOTO 1270
     :ELSE RETURN'KVWL
1270 PRINT"[DOWN2]MS-DOS DISK FULL"
     :GOSUB 1220:GOSUB 190
     :GOTO 630'ENXL
1280 WINDOW 0,0,79,24,1:SLOW:END'DPUI
```

END

SOFTWARE REVIEWS/JET AND SCENERY DISKS

Continued from pg. 32

while not hindering the performance of your plane.

The game randomly selects a group of targets before the Target Strike challenge begins. Several nights ago a certain factory in the sequence of structures on the ground was a target. Tonight the same factory is just a part of the scenery.

Hints

My advice to new players is to learn how to recognize each type of enemy aircraft by its shape. Then study the technical data available for each MIG in the operating manual and observe their attack strategies in the air. This research should reveal possible enemy weaknesses and help you formulate a method of dealing with your foes.

As you play the game, keep a watchful eye on the radar screen. If you detect an incoming surface-to-air-missile, whatever you do—don't panic. A clever player will automatically begin an evasive maneuver. Sometimes you can simply avoid a missile by changing your heading. And once in a while you may even get a glimpse of a missile coming toward you if your jet is pointed right.

A wise player will fly his bombing missions as low to the ground as possible. This strategy makes it hard for the surface-to-air missiles to track you.

Sooner or later one of those little devils will score a direct hit on your air ship. When this happens, the screen will begin flashing red and the aircraft will start tumbling out of control. If you should find yourself in this deadly situation, eject from your plane. Yes, the pilot has a short period of time to abandon ship. A successful ejection before the aircraft crashes earns the pilot a new plane. You can also eject even if the jet hasn't been hit. If you're flying along and decide to eject, you can watch the jet fly away below you as you hang from your parachute. Your only restriction is you can eject from a plane only twice per game.

Evaluation

The graphics of *Jet* are simple but adequate. Everything found on the control/instrument screen is evenly spaced and easy to read. Unfortunately, objects in the air and things on the ground contain very few details. MIG's in the air resemble simple wire graphic images, while oil tanks on the ground are merely shapes. It seems that the programmers tried to avoid accessing the disk once the main program is loaded in.

I was impressed with *Jet*'s colors. *Jet*'s creator kept things simple by using blue for the sky and water, green for the ground, black and white for objects, and yellow for miscellaneous. The only exception to this color scheme is when you take off from the carrier. Here the ocean is green so you can tell the difference between sky and water.

Sounds in the program are good. The noise of the jet has two separate voices. A rumbling sound is always there, and as you modify your thrust, a high-pitched whine lets you hear the increase and decrease of power.

Scenery Disks

The Scenery Disks were constructed from digitized sectional maps. Sectional maps define an area by displaying many of the physical features of that region, including airports, bodies of water and highways. Some pilots prefer using sectional maps when they fly because it's easier to navigate from one location to another using the predominant features beneath you as reference points.

Sublogic took the sectional maps displaying the United States and condensed about three of them into each Scenery Disk. The entire continental United States is stored on 12 disks. Population was a major factor in determining how many square miles would fit on a single Scenery Disk, because the greater the population of an area, the more landmarks and airports there are. That explains why large regions of the West can be stuffed onto one disk.

Several nights ago I loaded in Scenery Disk #6, which covers a region containing Omaha, Wichita and Kansas City. In recent years, I have actually flown around the Quincy, Illinois, area and I wanted to see how accurately that location was depicted in the program. I can honestly say that the runways of the Quincy airport are properly displayed, with several major highways to the west of the city appearing correctly.

I have also used the electronic navigational aids of the Scenery Disk flying the Piper Archer from *Flight Simulator II*. Basically, these electronic navigational aids work well.

The Scenery Disks are a lot of fun. They contain major roads, airports and bodies of water. SubLogic is releasing a series of Star Disks for flying around a smaller region which will contain more local landmarks.

In conclusion, a plus for *Jet* is the fact that it's very forgiving of minor mistakes. In fact, I've taken off from the grass surrounding the runway several times lately. The programmer has also made this flight simulation less complicated and more enjoyable for the average computer user. Most consumers will enjoy this flight simulation more than others, because it was written and documented more with them in mind.

On the other hand, *Jet* lacks the editor mode of the *Flight Simulator II*. You're forever cursed to flying clear blue skies under ideal weather conditions. *Jet*'s screen updating system could also use some improvement. As things are, the viewing screen is slowly updated during every few seconds of flight. It really needs a smoother updating system.

After working with *Jet* for many hours, Randy and I both agree that the flight simulation is quite entertaining. We both enjoyed its combat missions, and I still find them very challenging. I recommend *Jet* for eleven year-olds and up. ■

BLUE READER

Continued from pg. 35

read from or written to even though the physical length of a sector varies from track to track. Commodore's GCR format, on the other hand, pays no attention to the index hole; instead, timing is handled by synchronization marks that the drive writes on each sector.

Because CP/M and MS-DOS both employ IBM System-34 formatting, you might think that their disks would be interchangeable. No such luck. The way the data is managed on the disk differs in CP/M and MS-DOS.

Fortunately, however, the Commodore 1571 is really two drives in one and can recognize both GCR and System-34. Its ROM is such that the 1571 can understand CP/M, but not MS-DOS—which is why it can read and write Kaypro and Osborne disks, but not IBM-PC disks.

What *The Big Blue Reader* does is over-write the 1571 ROM with instructions that enable it to make sense of MS-DOS. Then it can't recognize CP/M until it's reset, but that's hardly cause for complaint—unless, of course, you'd like to exchange data between CP/M and MS-DOS or Commodore disks. C

CHESSMASTER

Continued from pg. 26

strategy and—hopefully—learn to apply these to your own game. Since the games have already been played—some of them hundreds of years ago—the recreation of them is swift.

You can really learn alot from the documentation. The rules and playing of the game was provided by the United States Chess Federation, who also include with the game a card for discount membership. This section is well illustrated and easy to understand. The booklet also features a history of chess, a section on world-class chess players, a history of chess as played by machines, the library of classic games contained on the Games disk, and a section on famous chess problems. Hopefully it will get you in the frame of mind to defeat the computer once and for all.

But if you can't defeat the computer, you can always defeat a friend. *Chessmaster 2000* allows you to play against a person with the computer as judge, signaling illegal moves and mates.

Because *Chessmaster 2000* is very sophisticated, it supports moves forgotten or ignored by some versions of the game, such as Castling, En Passant and Pawn Promotion. In Castling, which involves moving two pieces on one turn, designating the move for the King will cause the rook to automatically move to his former place—but only if the computer decides the move is legal at this time. Don't try anything sneaky.

You may also choose to have the computer play against itself. You could learn a bit by watching this, but you'll probably find it to be a bit more interesting if you and a friend place side bets on the different colors and...well, never mind. Or rather than play a full game from start to finish, you can set up the board with any classic chess problem or one of your own, much like taking over a game in progress.

Chessmaster 2000 is a colorful and exciting addition to the library of computer chess. Graphic representation is clear and sharp and the sound, while not necessary, can be made to come and go at will. The documentation is interesting and informative, and the routines of 3-D perspective and board rotation, while they may not improve your game, are most worthwhile. And certainly, all of us at one time or another have found the solution to a problem by stepping back and viewing it from a different angle. C

SPITFIRE

Continued from pg. 28

caused a crack-up yet, I suspect that as I accumulate more flying time, the game will grow less forgiving of my sloppy landings.

In one sense, then, the built-in but undisclosed difficulty factors add a measure of excitement and uncertainty to play. On the other hand, the rulebook's circumspection runs the risk of undercutting the satisfaction that comes with experience. A game which penalizes you without warning for actions it previously allowed treads a fine line between challenge and frustration.

Every game of *Spitfire '40* begins slowly due to the necessity of taking off and climbing to the altitude of the German fighter planes. Once you encounter the enemy, however, the action speeds up to a blur. Dogfights are fast and lethal, and can literally end in the blink of an eye. In fact, combat may be a shade too deadly. Aircraft in *Spitfire '40* never sustain partial damage—enemy fighters either shoot you out of the sky or miss completely. The game does not give you the chance to parachute to safety out of a downed plane and avoid losing credit for any kills scored in the current mission.

A more serious problem with *Spitfire '40* is the sense of sameness that sets in after a dozen flights or so. Although Spitfire pilots historically faced several types of German fighters and bombers during the Battle of Britain, in the simulator your foe is limited to a single kind of fighter, the Messerschmitt 109. The missions also lack any distinct objectives. Your sole concern is improving your personal score. Other than that, you are never out to accomplish any particular goal, nor are you trying to prevent the enemy planes from fulfilling some design of their own. Each new mission essentially becomes a repeat of the previous flight; only the level of difficulty changes.

The unvarying nature of the missions in *Spitfire '40* threatens to make even the thrills of combat seem commonplace after awhile. The game's ability to retain your interest over the course of repeated playings is questionable. If the pursuit of personal glory provides motivation and challenge enough, then *Spitfire '40* will not disappoint you. Given time, however, it will not excite you much either. I would recommend it for the novice flyer who is just getting his wings. C

GNOME KIT

Continued from pg. 39

provides are simple ways to rename a disk and rename file names. This means you can rewrite each directly. For instance, if a program needs to be loaded using the LOAD"name",8,1 command, you could rewrite the name to include a ,8,1: after it and before the program file identification. Thus, to properly load such a machine-language program, all you need to do is list the directory, type LOAD over the block size and press RETURN. And presto, the program loads back into the same memory location it was saved from.

The disk facility is a real lifesaver when a voltage shortage splats a sequential file or the disk is otherwise corrupted. A knowledgeable programmer could use the program to reconstruct the end of the file so it can be saved.

The program's command structure is simple and direct, requiring you only begin each command with a period followed by a one-letter command. After a repeating command is issued (like automatic numbering or dump to printer), the command is in effect until it is either cancelled or you hit a SHIFT/RETURN.

The program's powerful commands I've mentioned in this review only begin to describe the gold mine of programmer aids *Gnome Kit* contains. I found the more I used *Gnome Kit*, the more help I could squeeze out of each command. It's like a microwave oven—you don't know how helpful it can be until you use it, and then you don't want to cook without it.

The program comes with a 38-page manual containing examples and a quick reference card. Several sample programs are also stored on the program disk and serve as a tutorial. Kira Software will send a registered owner a duplicate disk for $5. You must also be a registered owner to receive phone support.

Kira brought all the very best programming aids together in *Gnome Kit* and serves them up in one compact easy-to-use package. The kit is ideal for serious programmers, whether novice or experienced. If you've been losing sleep tracing bugs, hunting for villainous variables, or reconstructing subroutines by hand, you need *Gnome Kit*—it's a programmer's salvation. C

Ed. Note: As this review went to press, several new features had been added to the 128 version: BASIC scrolling both forward and backward and a find-replace option.

MASTERTRONICS

Continued from pg. 41

sional appearance of the titled sword provides you with some offensive punch, temporarily transforming your character into a winged, invincible super-knight.

Big Mac, a Mastertronic re-release of a past favorite, follows the undercover exploits of Agent 007 3/3. His mission: to infiltrate the arch enemy's power station and shut down its energy supply without being detected. Eighteen different chambers (screens) must be entered, crossed and cleared for the operation to be a success. Each room is a unique visual puzzle, requiring a different strategic approach for completion. Players without nerves of steel need not apply.

For those who enjoy space games, *One Man and His Droid* and *Nonterraqueous* are right in your orbit. The first is an unusual outer space roundup where the player must corral and capture an alien form of sheep called ramboids. The wrangling is performed by a joystick-controlled droid, who can tunnel, fly and dig his way around the herd in an attempt to get them to market. The unfamiliar game objective and uncommon control structure may take a little getting used to, but once you've played it, you won't want to put it down.

Nonterraqueous is a search-and-destroy epic that spans over 1,000 screens. Players must battle wave after wave of alien craft in an attempt to reach a tyrannical computer that has taken mind control over the inhabitants of your futuristic planet. It is an unabashed shoot-'em-up that will give your trigger finger an exhausting workout.

The final package, containing *Kane* and *Human Race*, is a gaming smorgasbord. Each contest is actually a compilation of several short arcade tests linked together by a common theme. In *Kane* you take on the role of an Old West sheriff. Surviving a day in the life of a lawman will be a tough task, as you will be asked to display your adeptness at horse handling, bow and arrow hunting and Main Street showdowns.

Human Race traces man's 35-million year evolution in five different games. Every possible reflex will be tested as you jump, climb, duck and dash your way through history. But be warned: this is one tough contest. Your progression through time will surely take time. But every episode is solvable, so stick with it.

For those of you whose gaming appetite is bigger than your billfold, Gameware's *Two on One* is a software oasis. C

BY RICHARD F. DALEY AND SALLY J. DALEY

Conundrum

for the Commodore 64

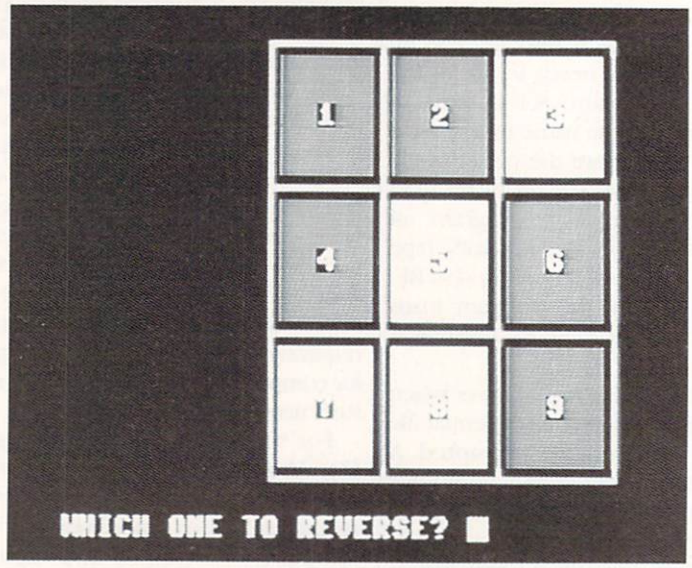
Webster defines conundrum as a puzzle that is difficult or nearly impossible to solve. Thus comes the name for this game. A quick glance at the game's tic-tac-toe-like design and the short list of rules makes thoughts of playing Conundrum very deceptive, for while the playing screen and the rules for play are simple, winning is not. If you are challenged by nearly impossible puzzles, then this game is for you!

Upon running this program, a title page is displayed on the screen. When you press RETURN, the screen clears and a blue box divided into nine sections appears on the screen. These sections are numbered from one to nine beginning with the upper left-hand section going from left to right. After a very brief delay, each of these nine sections is filled with color—either red or green. At the bottom of the screen is the question "WHICH ONE TO REVERSE?" with a flashing checkerboard-pattern cursor next to it.

To play, press a number key between 1 and 9. The computer will immediately reverse the color of the appropriate sections, so you don't need to press RETURN to enter the number.

The object of Conundrum is to have all of the outside sections (sections one, two, three, four, six, seven, eight, and nine) colored green, with the center section (section five) colored red. The number that you enter informs the computer of which section you want the color reversed. For example, if section nine is red, press the number 9 key, and it will become green.

Hey, wait! Don't turn the page yet! There's a little complication that you must consider as you are pressing keys to change colors. When you reverse the color of one section, other sections are



This puzzle is only for those who are stimulated by nearly impossible challenges!

also affected. For example, when you enter the number 9 wanting to reverse its color from red to green, the color of sections five, six, and seven will also be reversed. This would be helpful when section five is green and sections six and seven are red, but what if they are already the proper color?

There are three rules that apply to these color changes. When changing the color of each of the four corners (sections one, three, seven, and nine), each of the two adjacent sections plus the center section (section five) will also change. For example, if you choose to reverse section three, sections two, five and six will also be reversed.

When changing the color of a section in the center of each side (sections two, four, six, and eight), the adjacent corner sections will also be changed. If you enter the number 8, sections seven and nine will also be reversed. And when you select section five, the positions adjacent to it (sections two, four, six, and eight) will change as well.

Once you have mastered Conundrum using the above rules, you might want to experiment with making up your own rules for changing the colors. The code which controls the color changes is found in lines 430 to 510 of the program. Variable T contains the count of how many sections are to be reversed when a particular section is chosen. The values of RV( ) specify which sections these are.

Here is a helpful hint to those who have become discouraged with the nearly impossible aspects of this game. Reverse sections so that the colors are arranged in a symmetrical pattern. Then winning is a matter of only a few more key strokes. Simple, right?

It should be noted at this point that one of the Daleys under the byline of Richard F. Daley and Sally J. Daley has yet to win one game! Imagine the emotional duress under which this one Daley must work, for any time the other Daley wanders by, the cry arises, "I can't stand it!" and in only a few keystrokes, the game is won. I often wonder what the Daley who always wins would look like with a computer monitor as a hat! ■

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

Conundrum

```
180 PRINT "[CLEAR,DOWN4]";TAB(11);
  "*** [RVS] CONUNDRUM [RVOFF]
   ***"'CFAL
190 PRINT "[DOWN3]";TAB(19);"BY"'CFVH
200 PRINT "[DOWN2]";TAB(12);
  "RICHARD F. DALEY"'CFQC
```

```
210 PRINT TAB(18);"AND"'CEWY
220 PRINT TAB(13);"SALLY J.
    DALEY"'CEMD
230 GN$="[GREEN,RVS,SPACE5,RVOFF,DOWN,
    LEFT5,RVS,SPACE5,RVOFF,DOWN,LEFT5,
    RVS,SPACE2,RIGHT,SPACE2,DOWN,
    LEFT5,RVS,SPACE5,RVOFF,DOWN,LEFT5,
    RVS,SPACE5,RVOFF,UP4,RIGHT]"'BDBV
240 RD$="[RED,RVS,SPACE5,RVOFF,DOWN,
    LEFT5,RVS,SPACE5,RVOFF,DOWN,LEFT5,
    RVS,SPACE2,RIGHT,SPACE2,DOWN,
    LEFT5,RVS,SPACE5,RVOFF,DOWN,LEFT5,
    RVS,SPACE5,RVOFF,UP4,RIGHT]"'BDAW
250 RT$="[RIGHT11]": DN$="[DOWN5]
    "'CHCF
260 PRINT "[DOWN]PRESS [RVS]RETURN
    [RVOFF] TO BEGIN"'BADJ
270 GET KB$: IF KB$<>CHR$(13) THEN
    270'GOGJ
280 DIM SQ(9),RV(9)'BLSH
290 PRINT "[CLEAR]": POKE 53280,0
    : POKE 53281,0'DQOK
300 GOSUB 920:  FOR CT=1 TO 9
    : SQ(CT)=0: IF RND(TI)>.65 THEN
    SQ(CT)=1'KGAK
310 NEXT CT'BCZY
320 REM'BARY
330 REM *** MAIN LOOP ***'BOID
340 REM'BARB
350 GOSUB 1020: PRINT'CFJE
360 WN=0: GOSUB 580: IF WN<>0 THEN
    650'GORK
370 PRINT "[CYAN]WHICH ONE TO
    REVERSE?[SPACE6,LEFT5]";
    : GOSUB 790'CFRQ
380 IF VAL(KB$)<1 OR VAL(KB$)>9 THEN
    PRINT "[UP2]": GOTO 370'JQMP
390 IF SQ(VAL(KB$))=1 THEN
    SQ(VAL(KB$))=0: GOTO 410'HYXP
400 SQ(VAL(KB$))=1'CKIB
410 ON VAL(KB$) GOTO 430,440,450,460,
    470,480,490,500,510'DPLI
420 GOTO 350'BDHB
430 T=3: RV(1)=2: RV(2)=4: RV(3)=5
    : GOTO 520: REM SQUARE 1'GKLN
440 T=2: RV(1)=1: RV(2)=3: GOTO 520
    : REM SQUARE 2'FDNL
450 T=3: RV(1)=2: RV(2)=5: RV(3)=6
    : GOTO 520: REM SQUARE 3'GKPP
460 T=2: RV(1)=1: RV(2)=7: GOTO 520
    : REM SQUARE 4'FDTN
470 T=4: RV(1)=2: RV(2)=4: RV(3)=6
    : RV(4)=8: GOTO 520
    : REM SQUARE 5'HRXT
480 T=2: RV(1)=3: RV(2)=9: GOTO 520
    : REM SQUARE 6'FDAP
490 T=3: RV(1)=4: RV(2)=5: RV(3)=8
```

```
    : GOTO 520: REM SQUARE 7'GKXT
500 T=2: RV(1)=7: RV(2)=9: GOTO 520
    : REM SQUARE 8'FDBJ
510 T=3: RV(1)=8: RV(2)=5: RV(3)=6
    : REM SQUARE 9'FGSK
520 FOR CT=1 TO T: IF SQ(RV(CT))=1
    THEN SQ(RV(CT))=0: GOTO 540'IGMN
530 SQ(RV(CT))=1'BLDF
540 NEXT CT: GOTO 350'CGPF
550 REM'BARE
560 REM *** CHECK FOR WIN ***'BROJ
570 REM'BARG
580 FOR CT=1 TO 9: IF SQ(CT)=1 THEN
    WN=WN+1'IRMQ
590 NEXT CT: IF WN=8 AND SQ(5)=0 THEN
    WN=1: RETURN'IQFR
600 IF WN=0 THEN WN=-1: RETURN'GHEF
610 WN=0: RETURN'CEDD
620 REM'BARC
630 REM *** GAME OVER - DISPLAY
    WINNER AND EXIT ***'BKEN
640 REM'BARE
650 J=0: IF WN=-1 THEN 750'FJCK
660 PRINT "[L. GREEN,HOME,DOWN,RIGHT,
    SHFT M,SPACE2,SHFT N,DOWN,LEFT3,
    SHFT M,SHFT N,DOWN,LEFT3] [CMDR M]
     [DOWN,LEFT3] [CMDR M] [RIGHT,UP3,
    RIGHT2,SHFT N,CMDR T,SHFT M,DOWN,
    LEFT3,CMDR G] [CMDR M] [DOWN,
    LEFT4,CMDR G] [CMDR M] [DOWN,
    LEFT4]";'BBHI
670 PRINT "[SHFT M,CMDR @,SHFT N,UP3,
    RIGHT2,CMDR G] [CMDR M] [DOWN,
    LEFT4,CMDR G] [CMDR M] [DOWN,
    LEFT4,CMDR G] [CMDR M] [DOWN,
    LEFT4,SHFT M,CMDR @,SHFT N,UP3,
    RIGHT6]";'BBPD
680 PRINT "[CMDR G,SPACE2,CMDR M,DOWN,
    LEFT4,CMDR G,SPACE2,CMDR M,DOWN,
    LEFT4,CMDR G,SPACE2,CMDR M,DOWN,
    LEFT4]";'BBZV
690 PRINT "[SHFT M,SHFT N,SHFT M,
    SHFT N,UP3,RIGHT2,SHFT N,CMDR T,
    SHFT M,DOWN,LEFT3,CMDR G] [CMDR M,
    DOWN,LEFT3,CMDR G] [CMDR M,DOWN,
    LEFT3,SHFT M,CMDR @,SHFT N,UP3,
    RIGHT,CMDR M,SHFT M,SPACE3,CMDR G,
    DOWN,LEFT6]";'BBYL
700 PRINT "[CMDR M] [SHFT M,SPACE2,
    CMDR G,DOWN,LEFT6,CMDR M,SPACE2,
    SHFT M] [CMDR G,DOWN,LEFT6,CMDR M,
    SPACE3,SHFT M,CMDR G,UP3,RIGHT,
    SHFT -,DOWN,LEFT,SHFT -,DOWN,LEFT,
    SHFT -,DOWN,LEFT,SHFT W]"'BAHX
710 PRINT "[HOME,DOWN3]";DN$;DN$;DN$;
    DN$;"[WHITE]DO YOU WISH TO PLAY
    AGAIN? ";:GOSUB 790'CWGP
720 IF LEFT$(KB$,1)="Y" THEN 290'EKAI
730 PRINT "[CLEAR,L. BLUE]
    THANKS FOR THE GAME"'BABK
740 POKE 53280,14: POKE 53281,6
    : END'DRAK
750 PRINT "[HOME,DOWN2,PURPLE]";DN$;
    DN$;DN$;DN$;"HOW CLUMSY OF YOU!
    YOU LOSE!": GOTO 710'CVWU
760 REM'BARH
770 REM *** KEYBOARD INPUT SUBROUTINE
    ***'BEXQ
780 REM'BARJ
790 PRINT "[RVS,CMDR +,RVOFF,LEFT]";
    'BBOM
800 GET KB$'BDGD
810 IF KB$<>"" THEN IF ASC(KB$)<>13
    THEN PRINT " ": RETURN'LLMM
820 FOR CT=1 TO 40'DFDH
830 GET KB$'BDGG
840 IF KB$<>"" THEN IF ASC(KB$)<>13
    THEN PRINT " ": RETURN'LLMP
850 NEXT CT: PRINT "[CMDR +,LEFT]";
    : FOR CT=1 TO 40'FKSN
860 GET KB$'BDGJ
870 IF KB$<>"" THEN IF ASC(KB$)<>13
    THEN PRINT " ": RETURN'LLMS
880 NEXT CT: GOTO 790'CGXM
890 REM'BARL
900 REM *** SUBROUTINE TO PRINT THE
    GRID ON THE SCREEN ***'BQQP
910 REM'BARE
920 PRINT DN$;RT$;"[UP3,BLUE,CMDR A,
    SHFT *,SHFT C,SHFT *3,CMDR R,
    SHFT *,SHFT C,SHFT *3,CMDR R,
    SHFT *,SHFT C,SHFT *3,CMDR S]"
    : GOSUB 980: FOR J=1 TO 2'FQRC
930 PRINT RT$;"[CMDR Q,SHFT *,SHFT C,
    SHFT *3,SHFT +,SHFT *,SHFT C,
    SHFT *3,SHFT +,SHFT *,SHFT C,
    SHFT *3,CMDR W]": GOSUB 980'CIRX
940 NEXT J: PRINT RT$;"[CMDR Z,SHFT *,
    SHFT C,SHFT *3,CMDR E,SHFT C,
    SHFT *4,CMDR E,SHFT *,SHFT C,
    SHFT *3,CMDR X]": PRINT "[YELLOW,
    HOME]"DN$RT$"[DOWN]";'DODC
950 FOR CT=1 TO 9: PRINT "[RIGHT2]";
    CT;"[RIGHT]";'EKXN
960 IF CT/3=INT(CT/3) AND CT<>9 THEN
    PRINT: PRINT "[DOWN5]";RT$;'LRMU
970 NEXT CT: RETURN'CDYL
980 FOR CT=1 TO 5: PRINT RT$;"[SHFT -,
    SPACE5,SHFT -,SPACE5,SHFT -,
    SPACE5,SHFT -]": NEXT CT
    : RETURN'GNFX
990 REM'BARM
1000 REM *** SUBROUTINE TO DISPLAY
     CURRENT STATUS OF SQUARES
     ***'BWUH
1010 REM'BART
1020 PRINT "[HOME,DOWN]";DN$;RT$;"
     [UP2,RIGHT]";: FOR CT=1 TO 9'EPXC
1030 IF SQ(CT)=1 THEN PRINT GN$;
     : GOTO 1050'FQHC
1040 PRINT RD$;'BEQX
1050 IF CT/3=INT(CT/3) THEN PRINT
     : PRINT "[DOWN5]";RT$;"[RIGHT]";
     'IPXH
1060 NEXT CT: RETURN'CDYA
```

END

'64 or '128 Software

Take your Pick!

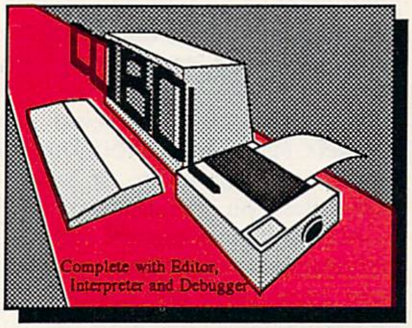
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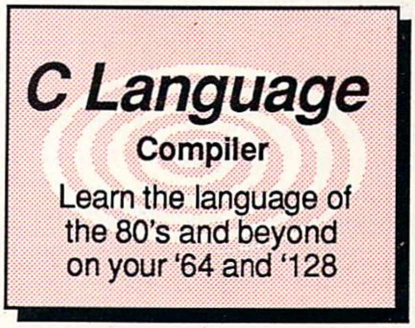
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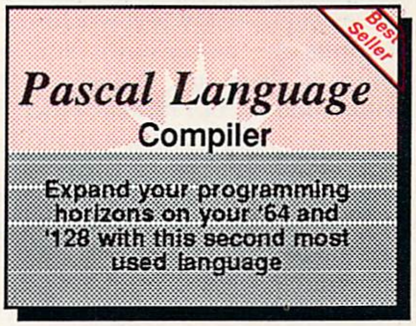
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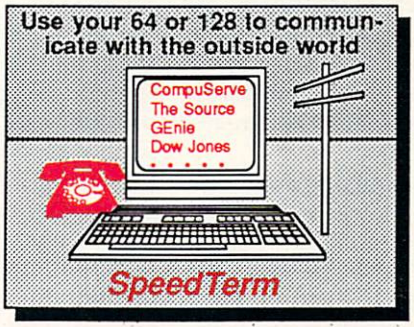
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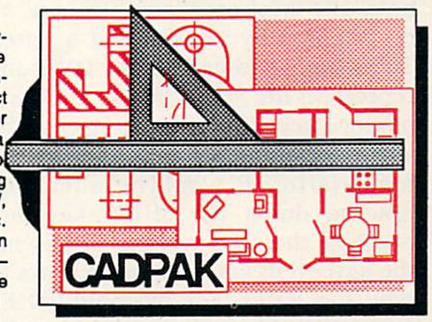
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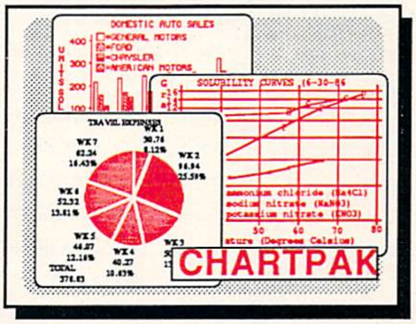
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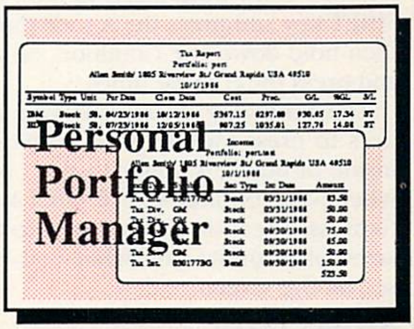
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HOW TO ENTER PROGRAMS

The programs which appear in this magazine have been run, tested and checked for bugs and errors. After a program is tested, it is printed on a letter quality printer with some formatting changes. This listing is then photographed directly and printed in the magazine. Using this method ensures the most error-free program listings possible.

Whenever you see a word inside brackets, such as [DOWN], the word represents a keystroke or series of keystrokes on the keyboard. The word [DOWN] would be entered by pressing the cursor-down key. If multiple keystrokes are required, the number will directly follow the word. For example, [DOWN4] would mean to press the cursor-down key four times. If there are multiple words within one set of brackets, enter the keystrokes directly after one another. For example, [DOWN,RIGHT2] would mean to press the cursor-down key once and then the cursor-right key twice. Note: Do not enter the commas.

In addition to these graphic symbols, the keyboard graphics are all represented by a word and a letter. The word is either SHFT or CMD and represents the SHIFT key or the Commodore key. The letter is one of the letters on the keyboard. The combination [SHIFT E] would be entered by holding down the SHIFT key and pressing the E. A number following the letter tells you how many times to type the letter. For example, [SHFT A4,CMD B3] would mean to hold the SHIFT key and press the A four times, then hold down the Commodore key and press the B three times.

The following chart tells you the keys to press for any word or words inside of brackets. Refer to this chart whenever you aren't sure what keys to press. The little graphic next to the keystrokes shows you what you will see on the screen.

Syntax Error

This is by far the most common error encountered while entering a program. Usually (sorry folks) this means that you have typed something incorrectly on the line the syntax error refers to. If you get the message "?Syntax Error Break In Line 270," type LIST 270 and press RETURN. This will list line 270 to the screen. Look for any non-obvious mistakes like a zero in place of an O or vice-versa. Check for semicolons and colons reversed and extra or missing parentheses. All of these things will cause a syntax error.

There is only one time a syntax error will tell you the wrong line to look at. If the line the syntax error refers to has a function call (e.g., FN A(3)), the syntax error may be in the line that defines the function, rather than the line named in the error message. Look for a line near the beginning of the program (usually) that has DEF FN A(X) in it with an equation following it. Look for a typo in the equation part of this definition.

Illegal Quantity Error

This is another common error message. This can also be caused by a typing error, but it is a little harder to find. Once again, list the line number that the error message refers to. There is probably a poke statement on this line. If there is, then the error is referring to what is trying to be poked. A number must be in the range of zero to 255 to be poke-able. For example, the statement POKE 1024,260 would produce an illegal quantity error because 260 is greater than 255.

Most often, the value being poked is a variable (A,X...). This error is telling you that this variable is out of range. If the variable is being read from data statements, then the problem is somewhere in the data statements. Check the data statements for missing commas or other typos.

If the variable is not coming from data statements, then the problem will be a little harder to find. Check each line that contains the variable for typing mistakes.

Out Of Data Error

This error message is always related to the data statements in a program. If this error occurs, it means that the program has run out of data items before it was supposed to. It is usually caused by a problem or typo in the data statements. Check first to see if you have left out a whole line of data. Next, check for missing commas between numbers. Reading data from a page of a magazine can be a strain on the brain, so use a ruler or a piece of paper or anything else to help you keep track of where you are as you enter the data.

Other Problems

It is important to remember that the 64 and the PET/CBM computers will only accept a line up to 80 characters long. The VIC 20 will accept a line up to 88 characters long and the 128 a line up to 160 characters long. Sometimes you will find a line in a program that runs over this number of characters. This is not a mistake in the listing. Sometimes programmers get so carried away crunching programs that they use abbreviated commands to get more than the standard number of characters on one line.

"[HOME]" = UNSHIFTED CLR/ HOME
"[CLEAR]" = SHIFTED CLR/HOME
"[DOWN]" = CURSOR DOWN
"[UP]" = CURSOR UP
"[RIGHT]" = CURSOR RIGHT
"[LEFT]" = CURSOR LEFT
"[RVS]" = CONTROL 9
"[RVOFF]" = CONTROL 0
"[BLACK]" = CONTROL 1
"[WHITE]" = CONTROL 2
"[RED]" = CONTROL 3
"[CYAN]" = CONTROL 4
"[PURPLE]" = CONTROL 5
"[GREEN]" = CONTROL 6
"[BLUE]" = CONTROL 7
"[YELLOW]" = CONTROL 8
"[ORANGE]" = COMMODORE 1
"[BROWN]" = COMMODORE 2
"[L. RED]" = COMMODORE 3
"[GRAY1]" = COMMODORE 4
"[GRAY2]" = COMMODORE 5
"[L. GREEN]" = COMMODORE 6
"[L. BLUE]" = COMMODORE 7
"[GRAY3]" = COMMODORE 8
"[F1]" = F1
"[F2]" = F2
"[F3]" = F3
"[F4]" = F4
"[F5]" = F5
"[F6]" = F6
"[F7]" = F7
"[F8]" = F8
"[POUND]" = ENGLISH POUND
"[SHFT ^]" = PI SYMBOL
"[^]" = UP ARROW

GRAPHIC SYMBOLS WILL BE REPRESENTED AS EITHER THE LETTERS SHFT (SHIFT) AND A KEY ("[SHFT Q,SHFT J,SHFT D,SHFT S]") OR THE LETTERS CMDR (COMMODORE) AND A KEY ("[CMDR Q,CMDR G,COMDR Y,CMDR H]"). IF A SYMBOL IS REPEATED, THE NUMBER OF REPITITIONS WILL BE DIRECTLY AFTER THE KEY AND BEFORE THE COMMA ("[SPACE3,SHFT S4,CMDR M2]").

HOW TO ENTER PROGRAMS

You can enter these lines by abbreviating the commands when you enter the line. The abbreviations for BASIC commands are in your user guide.

If you type a line that is longer than the acceptable number of characters, the computer will act as if everything is ok, until you press RETURN. Then, a syntax error will be displayed (without a line number). Many people write that the computer gives them a syntax error when they type the line, or that the computer refuses to accept a line. Both of these problems are results of typing a line that has too many characters.

The Program Won't Run!!

This is the hardest of problems to resolve; no error message is displayed, but the program just doesn't run. This can be caused by many small mistakes typing a program in. First check that the program was written for the computer you are using. Check to see if you have left out any lines of the program. Check each line of the program for typos or missing parts. Finally, press the RUN/STOP key while the program is "running." Write down the line the program broke at and try to follow the program backwards from this point, looking for problems.

If All Else Fails

You've come to the end of your rope. You can't get the program to run and you can't find any errors in your typing. What do you do? As always, we suggest that you try a local user group for help. In a group of even just a dozen members, someone is bound to have typed in the same program. The user group may also have the program on a library disk and be willing to make a copy for you. For $9.95 per issue, you can also get all the BASIC programs in each issue, as well, from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007.

If you do get a working copy, be sure to compare it to your own version so that you can learn from your errors and increase your understanding of programming.

If you live in the country, don't have a local user group, or you simply can't get any help, write to us. If you do write to us, include the following information about the program you are having problems with:

The name of the program
The issue of the magazine it was in
The computer you are using
Any error messages and the line numbers
Anything displayed on the screen
A printout of your listing (if possible)

All of this information is helpful in answering your questions about why a program doesn't work. A letter that simply states "I get an error in line 250 whenever I run the program" doesn't give us much to go on. Send your questions to:

Commodore Magazines
1200 Wilson Drive
West Chester, PA 19380
ATTN: Program Problem

HOW TO USE THE MAGAZINE ENTRY PROGRAMS

The Magazine Entry Programs on the next pages are two BASIC machine language programs that will assist you in entering the programs in this magazine correctly. There are versions for both the Commodore 64 and the Commodore 128. Once the program is in place, it works its magic without you having to do anything else. The program will not let you enter a line if there is a typing mistake on it, and better yet, it identifies the kind of error for you.

Getting Started

Type in the Magazine Entry Program carefully and save it as you go along (just in case). Once the whole program is typed in, save it again on tape or disk. Now RUN the program. The word POKING will appear on the top of the screen with a number. The number will increment from 49152 up to 49900 (4864-5545 on the 128) and just lets you know that the program is running. If everything is ok, the program will finish running and say DONE. Then type NEW. If there is a problem with the data statements, the program will tell you where to find the problem. Otherwise the program will say "mistake in data statements." Check to see if commas are missing, or if you have used periods instead of commas. Also check the individual data items.

Once the program has run, it is in memory ready to go. To activate the program type SYS49152 (SYS4864 on the 128), and press RETURN. You are now ready to enter the programs from the magazine. To disable the Entry Program, just type KILL (RETURN) on the 64 or SYS4867 on the 128.

The checksums for each line are the same for both the 64 and 128, so you can enter your 64 programs on the 128 if you'd like.

Typing the Programs

All the BASIC program listings in this magazine that are for the 64 or 128 have an apostrophe followed by four letters at the end of the line (e.g., 'ACDF). If you plan to use the Magazine Entry Program to enter your programs, the apostrophe and letters **should** be entered along with the rest of the line. This is a checksum that the Magazine Entry Program uses.

Enter the line and the letters at the end and then press RETURN, just as you normally would.

If the line is entered correctly, a bell is sounded and the line is entered into the computer's memory (without the characters at the end).

If a mistake was made while entering the line, a noise is sounded and an error message is displayed. Read the error message, then press any key to erase the message and correct the line.

IMPORTANT

If the Magazine Entry Program sees a mistake on a line, it **does not** enter that line into memory. This makes it impossible to enter a line incorrectly.

Error Messages and What They Mean

There are five error messages that the Magazine Entry Program uses. Here they are, along with what they mean and how to fix them.

Continued next page

HOW TO USE THE MAGAZINE ENTRY PROGRAMS

NO CHECKSUM: This means that you forgot to enter the apostrophe and the four letters at the end of the line. Move the cursor to the end of the line you just typed and enter the checksum.

QUOTE: This means that you forgot (or added) a quote mark somewhere in the line. Check the line in the magazine and correct the quote.

KEYWORD: This means that you have either forgotten a command or spelled one of the BASIC keywords (GOTO, PRINT . .) incorrectly. Check the line in the magazine again and check your spelling.

OF CHARACTERS: This means that you have either entered extra characters or missed some characters. Check the line in the magazine again. This error message will also occur if you misspell a BASIC command, but create another keyword in doing so. For example, if you misspell PRINT as PRONT, the 64 sees the letter P and R, the BASIC keyword ON and then the letter T. Because it sees the keyword ON, it thinks you've got too many characters, instead of a simple misspelling. Check spelling of BASIC commands if you can't find anything else wrong.

UNIDENTIFIED: This means that you have either made a simple spelling error, you typed the wrong line number, or you typed the checksum incorrectly. Spelling errors could be the wrong number of spaces inside quotes, a variable spelled wrong, or a word misspelled. Check the line in the magazine again and correct the mistake. ■

MAGAZINE ENTRY PROGRAM—64


```
10 PRINT"[CLEAR]POKING -";
20 P=49152 :REM $C000  (END AT
   49900/$C2EC)
30 READ A$:IF A$="END"THEN 110
40 L=ASC(MID$(A$,2,1))
50 H=ASC(MID$(A$,1,1))
60 L=L-48:IF L>9 THEN L=L-7
70 H=H-48:IF H>9 THEN H=H-7
80 PRINT"[HOME,RIGHT12]"P;
90 IF H>15 OR L>15 THEN PRINT
   :PRINT"DATA ERROR IN LINE";
   1000+INT((P-49152)/8):STOP
100 B=H*16+L:POKE P,B:T=T+B:P=P+1
    :GOTO 30
110 IF T<>86200 THEN PRINT
    :PRINT"MISTAKE IN DATA --> CHECK
    DATA STATEMENTS":END
120 PRINT"DONE":END
1000 DATA 4C,1F,C0,00,00,00,00,00
1001 DATA 00,00,00,00,00,0D,00,21
1002 DATA C1,27,C1,2F,C1,3F,C1,4C
1003 DATA C1,EA,EA,EA,4C,54,C0,A2
1004 DATA 05,BD,19,C0,95,73,CA,10
1005 DATA F8,60,60,A0,03,B9,00,02
1006 DATA D9,04,C1,D0,F5,88,10,F5
1007 DATA A0,05,B9,A2,E3,99,73,00
1008 DATA 88,10,F7,A9,00,8D,18,D4
1009 DATA 4C,EF,C0,E6,7A,D0,02,E6
1010 DATA 7B,4C,79,00,A5,9D,F0,F3
1011 DATA A5,7A,C9,FF,D0,ED,A5,7B
1012 DATA C9,01,D0,E7,20,2B,C0,AD
1013 DATA 00,02,20,74,C0,90,DC,A0
1014 DATA 00,4C,A9,C1,C9,30,30,06
1015 DATA C9,3A,10,02,38,60,18,60
1016 DATA C8,B1,7A,C9,20,D0,03,C8
1017 DATA D0,F7,B1,7A,60,18,C8,B1
1018 DATA 7A,F0,37,C9,22,F0,F5,6D
1019 DATA 03,C0,8D,03,C0,AD,04,C0
1020 DATA 69,00,8D,04,C0,4C,8E,C0
1021 DATA 18,6D,05,C0,8D,05,C0,90
1022 DATA 03,EE,06,C0,EE,09,C0,4C
1023 DATA CE,C1,18,6D,08,C0,8D,08
1024 DATA C0,90,03,EE,07,C0,EE,0A
1025 DATA C0,60,0A,A8,B9,0F,C0,85
1026 DATA FB,B9,10,C0,85,FC,A0,00
1027 DATA A9,12,20,D2,FF,B1,FB,F0
1028 DATA 06,20,D2,FF,C8,D0,F6,20
1029 DATA BC,C2,20,E4,FF,F0,FB,A0
1030 DATA 18,B9,08,C1,20,D2,FF,88
1031 DATA 10,F7,68,68,A9,00,8D,00
1032 DATA 02,4C,74,A4,4B,49,4C,4C
1033 DATA 91,91,0D,20,20,20,20,20
1034 DATA 20,20,20,20,20,20,20,20
1035 DATA 20,20,20,20,20,20,20,91
1036 DATA 0D,51,55,4F,54,45,00,4B
1037 DATA 45,59,57,4F,52,44,00,23
1038 DATA 20,4F,46,20,43,48,41,52
1039 DATA 41,43,54,45,52,53,00,55
1040 DATA 4E,49,44,45,4E,54,49,46
1041 DATA 49,45,44,00,4E,4F,20,43
1042 DATA 48,45,43,4B,53,55,4D,00
1043 DATA C8,B1,7A,D0,FB,84,FD,C0
1044 DATA 09,10,03,4C,84,C1,88,88
1045 DATA 88,88,88,B1,7A,C9,27,D0
1046 DATA 13,A9,00,91,7A,C8,A2,00
1047 DATA B1,7A,9D,3C,03,C8,E8,E0
1048 DATA 04,D0,F5,60,A9,04,4C,CA
1049 DATA C0,A0,00,B9,00,02,99,40
1050 DATA 03,F0,F0,C8,D0,F5,A0,00
1051 DATA B9,40,03,F0,E6,99,00,02
1052 DATA C8,D0,F5,20,96,C1,4C,12
1053 DATA C2,A0,09,A9,00,99,03,C0
1054 DATA 8D,3C,03,88,10,F7,A9,80
1055 DATA 85,02,A0,00,20,58,C1,20
1056 DATA 89,C1,20,ED,C1,E6,7A,E6
1057 DATA 7B,20,7C,A5,A0,00,20,80
1058 DATA C0,F0,D0,24,02,F0,06,4C
1059 DATA A8,C0,4C,CE,C1,C9,22,D0
1060 DATA 06,20,8D,C0,4C,CE,C1,20
1061 DATA BA,C0,4C,CE,C1,A0,00,B9
1062 DATA 00,02,20,74,C0,C8,90,0A
1063 DATA 18,6D,07,C0,8D,07,C0,4C
1064 DATA EF,C1,88,A2,00,B9,00,02
1065 DATA 9D,00,02,F0,04,E8,C8,D0
1066 DATA F4,60,18,AD,09,C0,69,41
1067 DATA 8D,09,C0,38,AD,0A,C0,E9
1068 DATA 19,90,06,8D,0A,C0,4C,1C
1069 DATA C2,AD,0A,C0,69,41,8D,0A
```

```
1070 DATA CØ,AD,Ø3,CØ,6D,Ø5,CØ,48
1071 DATA AD,Ø4,CØ,6D,Ø6,CØ,8D,ØC
1072 DATA CØ,68,6D,Ø8,CØ,8D,ØB,CØ
1073 DATA AD,ØC,CØ,6D,Ø7,CØ,8D,ØC
1074 DATA CØ,38,E9,19,9Ø,Ø6,8D,ØC
1075 DATA CØ,4C,52,C2,AD,ØC,CØ,69
1076 DATA 41,8D,ØC,CØ,AD,ØB,CØ,E9
1077 DATA 19,9Ø,Ø6,8D,ØB,CØ,4C,67
1078 DATA C2,AD,ØB,CØ,69,41,8D,ØB
1079 DATA CØ,AØ,Ø1,AD,Ø9,CØ,CD,3C
1080 DATA Ø3,DØ,2Ø,C8,AD,ØA,CØ,CD
1081 DATA 3D,Ø3,DØ,17,C8,AD,ØB,CØ
1082 DATA CD,3E,Ø3,DØ,ØE,AD,ØC,CØ
1083 DATA CD,3F,Ø3,DØ,Ø6,2Ø,CC,C2
1084 DATA 4C,4B,CØ,98,48,68,4C,CA
1085 DATA CØ,A9,2Ø,8D,ØØ,D4,8D,Ø1
1086 DATA D4,A9,Ø9,8D,Ø5,D4,A9,ØF
1087 DATA 8D,18,D4,6Ø,2Ø,A9,C2,A9
1088 DATA 81,2Ø,DF,C2,A9,8Ø,2Ø,DF
1089 DATA C2,4C,D9,C2,2Ø,A9,C2,A9
1090 DATA 11,2Ø,DF,C2,A9,1Ø,2Ø,DF
1091 DATA C2,A9,ØØ,8D,Ø4,D4,6Ø,8D
1092 DATA Ø4,D4,A2,7Ø,AØ,ØØ,88,DØ
1093 DATA FD,CA,DØ,FA,6Ø,END
```

END

MAGAZINE ENTRY PROGRAM—128

```
5 TRAP 2ØØ
1Ø PRINT"[CLEAR]POKING -";
2Ø P=4864 :REM $13ØØ  (END AT
   5545/$15A9)
3Ø READ A$:IF A$="END"THEN 11Ø
8Ø PRINT"[HOME,RIGHT12]"P;
1ØØ B=DEC(A$):POKE P,B:T=T+B:P=P+1
    :GOTO 3Ø
11Ø IF T<>59314 THEN PRINT
    :PRINT"MISTAKE IN DATA --> CHECK
    DATA STATEMENTS":END
12Ø PRINT"DONE":END
2ØØ PRINT:PRINT"DATA ERROR IN LINE";
    1ØØØ+INT((P-4864)/8):END
1ØØØ DATA 4C,1E,13,4C,3A,13,ØØ,ØØ
1ØØ1 DATA 8E,ØØ,F7,ØØ,42,41,51,57
1ØØ2 DATA ØD,ØØ,ØD,43,Ø8,14,ØE,14
1ØØ3 DATA 16,14,26,14,33,14,A9,ØØ
1ØØ4 DATA 8D,ØØ,FF,AD,Ø4,Ø3,8D,12
1ØØ5 DATA 13,AD,Ø5,Ø3,8D,13,13,A2
1ØØ6 DATA 4A,AØ,13,8E,Ø4,Ø3,8C,Ø5
1ØØ7 DATA Ø3,6Ø,AD,12,13,8D,Ø4,Ø3
1ØØ8 DATA AD,13,13,8D,Ø5,Ø3,6Ø,6C
1ØØ9 DATA 12,13,A5,7F,DØ,F9,AD,ØØ
1Ø1Ø DATA Ø2,2Ø,5B,13,9Ø,F1,AØ,ØØ
1Ø11 DATA 4C,6F,14,C9,3Ø,3Ø,Ø6,C9
1Ø12 DATA 3A,1Ø,Ø2,38,6Ø,18,6Ø,C8
1Ø13 DATA B1,3D,C9,2Ø,DØ,Ø3,C8,DØ
1Ø14 DATA F7,B1,3D,6Ø,18,C8,B1,3D
1Ø15 DATA FØ,35,C9,22,FØ,F5,6D,Ø6
1Ø16 DATA 13,8D,Ø6,13,AD,Ø7,13,69
1Ø17 DATA ØØ,8D,Ø7,13,4C,75,13,18
1Ø18 DATA 6D,Ø8,13,8D,Ø8,13,9Ø,Ø3
1Ø19 DATA EE,Ø9,13,EE,ØC,13,6Ø,18
1Ø2Ø DATA 6D,ØB,13,8D,ØB,13,9Ø,Ø3
1Ø21 DATA EE,ØA,13,EE,ØD,13,6Ø,ØA
1Ø22 DATA A8,B9,14,13,85,FB,B9,15
1Ø23 DATA 13,85,FC,AØ,ØØ,8C,ØØ,FF
1Ø24 DATA A9,12,2Ø,D2,FF,B1,FB,FØ
1Ø25 DATA Ø6,2Ø,D2,FF,C8,DØ,F6,2Ø
1Ø26 DATA 79,15,2Ø,A3,15,2Ø,E4,FF
1Ø27 DATA FØ,FB,AØ,1B,B9,EF,13,2Ø
1Ø28 DATA D2,FF,88,1Ø,F7,68,68,A9
1Ø29 DATA ØØ,8D,ØØ,Ø2,4C,B7,4D,91
1Ø3Ø DATA 91,ØD,2Ø,2Ø,2Ø,2Ø,2Ø,2Ø
1Ø31 DATA 2Ø,2Ø,2Ø,2Ø,2Ø,2Ø,2Ø,2Ø
1Ø32 DATA 2Ø,2Ø,2Ø,2Ø,2Ø,2Ø,91,ØD
1Ø33 DATA 51,55,4F,54,45,ØØ,4B,45
1Ø34 DATA 59,57,4F,52,44,ØØ,23,2Ø
1Ø35 DATA 4F,46,2Ø,43,48,41,52,41
1Ø36 DATA 43,54,45,52,53,ØØ,55,4E
1Ø37 DATA 49,44,45,4E,54,49,46,49
1Ø38 DATA 45,44,ØØ,4E,4F,2Ø,43,48
1Ø39 DATA 45,43,4B,53,55,4D,ØØ,C8
1Ø4Ø DATA B1,3D,DØ,FB,CØ,Ø9,1Ø,Ø3
1Ø41 DATA 4C,69,14,88,88,88,88,88
1Ø42 DATA B1,3D,C9,27,DØ,13,A9,ØØ
1Ø43 DATA 91,3D,C8,A2,ØØ,B1,3D,9D
1Ø44 DATA ØØ,ØB,C8,E8,EØ,Ø4,DØ,F5
1Ø45 DATA 6Ø,4C,5C,15,4C,C5,14,AØ
1Ø46 DATA Ø9,A9,ØØ,99,Ø6,13,8D,ØØ
1Ø47 DATA ØB,88,1Ø,F7,A9,8Ø,85,FD
1Ø48 DATA AØ,ØØ,2Ø,3F,14,2Ø,AE,14
1Ø49 DATA 2Ø,ØD,43,84,FA,AØ,FF,2Ø
1Ø5Ø DATA 67,13,FØ,D8,24,FD,FØ,Ø6
1Ø51 DATA 2Ø,8F,13,4C,8F,14,C9,22
1Ø52 DATA DØ,Ø6,2Ø,74,13,4C,8F,14
1Ø53 DATA 2Ø,9F,13,4C,8F,14,AØ,ØØ
1Ø54 DATA B9,ØØ,Ø2,2Ø,5B,13,C8,9Ø
1Ø55 DATA ØA,18,6D,ØA,13,8D,ØA,13
1Ø56 DATA 4C,BØ,14,88,6Ø,18,AD,ØC
1Ø57 DATA 13,69,41,8D,ØC,13,38,AD
1Ø58 DATA ØD,13,E9,19,9Ø,Ø6,8D,ØD
1Ø59 DATA 13,4C,CF,14,AD,ØD,13,69
1Ø6Ø DATA 41,8D,ØD,13,AD,Ø6,13,6D
1Ø61 DATA Ø8,13,48,AD,Ø7,13,6D,Ø9
1Ø62 DATA 13,8D,ØF,13,68,6D,ØB,13
1Ø63 DATA 8D,ØE,13,AD,ØF,13,6D,ØA
1Ø64 DATA 13,8D,ØF,13,38,E9,19,9Ø
1Ø65 DATA Ø6,8D,ØF,13,4C,Ø5,15,AD
1Ø66 DATA ØF,13,69,41,8D,ØF,13,AD
1Ø67 DATA ØE,13,E9,19,9Ø,Ø6,8D,ØE
1Ø68 DATA 13,4C,1A,15,AD,ØE,13,69
1Ø69 DATA 41,8D,ØE,13,AØ,Ø1,AD,ØC
1Ø7Ø DATA 13,CD,ØØ,ØB,DØ,2Ø,C8,AD
1Ø71 DATA ØD,13,CD,Ø1,ØB,DØ,17,C8
1Ø72 DATA AD,ØE,13,CD,Ø2,ØB,DØ,ØE
1Ø73 DATA AD,ØF,13,CD,Ø3,ØB,DØ,Ø6
1Ø74 DATA 2Ø,89,15,A4,FA,6Ø,98,48
1Ø75 DATA 68,4C,AF,13,A9,Ø4,4C,AF
1Ø76 DATA 13,A9,ØØ,8D,ØØ,FF,A9,2Ø
1Ø77 DATA 8D,ØØ,D4,8D,Ø1,D4,A9,Ø9
1Ø78 DATA 8D,Ø5,D4,A9,ØF,8D,18,D4
1Ø79 DATA 6Ø,2Ø,61,15,A9,81,2Ø,9C
1Ø8Ø DATA 15,A9,8Ø,2Ø,9C,15,4C,96
1Ø81 DATA 15,2Ø,61,15,A9,11,2Ø,9C
1Ø82 DATA 15,A9,1Ø,2Ø,9C,15,A9,ØØ
1Ø83 DATA 8D,Ø4,D4,6Ø,8D,Ø4,D4,A2
1Ø84 DATA 7Ø,AØ,ØØ,88,DØ,FD,CA,DØ
1Ø85 DATA FA,6Ø,END
```

END

USER GROUPS

Although there are almost 1000 known Commodore user groups nationwide and around the world, this list includes only those that have been officially recognized by Commodore as Approved User Groups. If your group would like to apply for Approved status, contact Pete Baczor, User Group Coordinator, at Commodore Business Machines, 1200 Wilson Drive, West Chester, PA 19380.

Commodore user groups provide invaluable assistance to Commodore computerists. If you are looking for people who share your computing interests, or if you need help getting started with your computer, contact the group near you.

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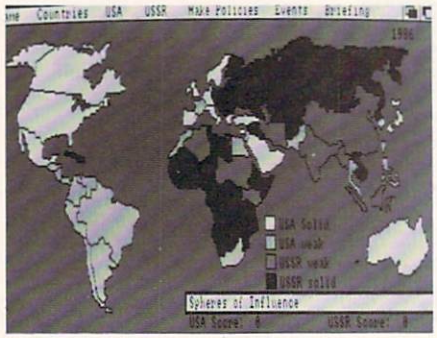
Continued from pg. 16

there will be an upgrade path for current owners, but that the upgrade policy has not yet been set.

Master Designer Software has licensed the rights to use the **Marx Brothers** and **Commander Cody** in new games under production for the Amiga. No release dates or other information was available yet, but I'll keep you posted.

Mindscape has released **The Perfect College** for the 64. This is a database program containing information on over 1,650 accredited four-year U.S. colleges and universities. The user selects criteria such as location, cost and academic interest (twenty-six elements total), and the program searches out all schools that fit the profile. All results can be printed out, and the database information is updated annually.

Also from **Mindscape** is **Balance of Power** for the Amiga. This is an educational game that asks the question "How can two superpowers co-exist in a world without starting World War III." It is a complex simulation of geo-politics—not a war game—where the player quickly finds that hardball stances lead to thermonuclear destruction. The goal is to keep the world in one piece, while gaining world prestige using diplomacy—military aid, treaties, military advisors, troops, covert destabilization, and political pressure.



Balance of Power

The game is played over a period of eight years, with the U.S. and U.S.S.R. alternating action each year. The goal is to build the highest prestige, and the side with the greatest prestige at the end of the game wins.

For a deeper understanding of the underlying philosophy of the game, I recommend reading the book of the same name, published by **Microsoft Press.** The author explains the theory of game design, gives a history of the development of the game, and explains the strategies required to play the game without it ending in a war.

NewTek is releasing **DigiPaint,** a paint program for the Amiga. It includes brushes, cut-and-paste routines, and other basic paint program functions. It has the ability to modify a single pixel's color without a ripple effect.

Also coming is an upgrade to the **DigiView** software. Additions include a 640 X 200 mode, an eight-color palette routine, a 20-second slow scan mode that dramatically improves resolution, and new software routines that improves results of a color video camera.

Westcom Industries has finished their hard disk backup program for the Amiga. Called **HardHat,** it gives the user several backup options: full disk, incremental, directory, or single file. All data stored on floppy is compressed for reduced space requirements. You may include a list of filenames to be ignored during backup, and the program maintains a current catalog of files, including their size, location and date stamps. The program supports multitasking, runs from the Workbench or CLI, and supports any AmigaDOS integrated hard disk.

Westcom is also releasing a spelling checker for the Amiga, called **Spel-It.** (Yes, that's how it's spelled.)

That wraps it up for this month. Until next month, that's all from the valley. ■

Lights . . . Camera . . . Action

Continued from pg. 77

Leeds: Do you expect that the entertainment industry will find other uses for the Amiga?

Lewis: The Amiga is the first computer that has the kind of features that make it usable for applications I use on a daily basis. Color is essential in the film industry, and the more of it the better. Ease of use is equally important. I'm certain that as more people find out what can be done with an Amiga, it will be used more often. ■

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Big Name Hunting...

Continued from pg. 73

also had a problem adjusting to the realities of 180×256 lines of screen resolution. They were used to creating 35MM material that would be seen by the public on a 20-foot movie screen.

On the other side of the fence, we had to adjust to some very tough quality standards. We weren't adapting Frogger™ to a home computer any longer. Now we were in the business of trying to duplicate the appearance and mannerisms of one of the most famous characters in the world. Recreating Donald Duck's waddle in a few pixels, for example, is almost impossible. We kept telling the Disney people that it couldn't be done. They would listen to all of our reasons for not being able to solve the problem and simply reply, "Donald has to waddle because it's one of his well known characteristics." So we'd go back to the drawing board and try again. After a while, our programmers discovered a way to produce the waddle by manipulating several sprites, in conjunction with some other stuff. In this situation, we accomplished what seemed to be impossible.

However, sometimes the Disney designers came up with an idea that really was impossible to achieve. Whenever this occured, we worked very closely with them in the hope that some aspect of the idea could be salvaged. Sierra programmers had never shared the job of designing software with outsiders before. Isn't it ironic that they'd be doing this work with non-programmers?

Jermaine: Have you had any unexpected problems creating Disney software?

Williams: In terms of released software, Sierra On-Line had to make a minor change in *Mickey's Space Adventure*, because we made the mistake of using the 1970's design of Mickey Mouse instead of the 1980's version. The big difference is the curve of Mickey's ears.

In terms of unreleased software, *Goofy's Word Factory* opened a whole new can of programming worms. Goofy™ is a Sierra/Disney collaboration which helps children learn about the parts of speech. When we started the project with the Disney designers, we didn't know what we were in for. Our people thought that *Goofy's Word Factory* would evolve into an arcade game, or something along that line of thinking. We had failed to take into account the Disney attitude towards writing educational material. After all, they've been working on school coarseware for almost 30 years, and have their own opinions of how children should be taught. So here we went to them with a proposal for four arcade games, featuring Goofy sorting out nouns, verbs, and so on. They examined our work, but asked us if we could write the program in the form of a story construction set. Children could input sentences and make them animate on the screen.

We decided to develop this concept of the program, but it also presented some interesting problems. It's hard to generate a program that takes in and understands information like "The space shuttle danced to the moon." The software actually contains a small space shuttle with legs that performs a jig. During the evolution of the program, we've taken about 100 different objects and given them the ability to walk, run, dance, and cry. It was also difficult to create program commands that the average child could understand. Once the initial program was completed, it was so large that we're not sure it will ever be officially finished.

Jermaine: What can you tell me about your relationship with Jim Henson, the creator of the Muppets™?

Williams: Our initial contact with Jim Henson was as a result of having a public relations office in New York City. Roberta Williams, the co-founder of Sierra On-Line, wanted to meet and work with the Henson people, so our agency arranged a private meeting. We discovered that both parties could work well together, a contract was written up, and we started developing the *Dark Crystal* program.

Jim Henson himself never visited us at Coarsegold, but Sierra On-Line went to New York often when we were working with them. Our contact for the project was a man named Chris Cerf who works closely with the Muppet designers. We received quite a bit of input from Henson and his group, and found them to be some of the most creative individuals we've ever worked with.

Jermaine: How did you acquire the Johnny Hart license to create the B.C.™ software?

Williams: Sierra On-Line actually had very little involvement in the B.C. projects from a design standpoint. The Sydney Development Company and Hart worked out all of the details. The first game in the series, *B.C.'s Quest for Tires*, was actually sold to us as a completed project. We paid six figures for a package which included the Coleco version of the game, a commercial for the product that we ran on MTV during the 1984 Christmas season, and the exclusive U.S. rights to the game.

Jermaine: Has Sierra On-Line considered buying the rights to many other license properties?

Williams: Yes, we have. Over the years, we've seriously looked at the licenses to Hagar the Terrible™, Beetle Bailey™, Mr. Bill™, 2010™, Mutiny on the Bounty™, The Smurfs™, Betty Boop™, Dungeons and Dragons™, Family Circle™, and several others. Each of these titles had a lot of potential, but in many cases, the license was too expensive or we couldn't develop a presentable product with the terms the licensor presented to us.

It might surprise you that Family Circle came the closest to being licensed by Sierra On-Line, considering the titles we've rejected. We seriously looked at creating a Family Circle Family Planner. This would have been a combination data base and spreadsheet that could keep track of insurance, bank deposits, vaccinations, and so on. Unfortunately, it ultimately became a question of cost versus benefit.

Jermaine: Is there any aspect of licensing we haven't covered?

Williams: I would like to point out that licensed games are often sold on a country-by-country basis. The first B.C. program is a perfect example. In America, *B.C.* is marketed by Sierra On-Line. In Japan, it belongs to Falmark. In Canada, the B.C. license is the property of the Sydney Development Company. In England, U.S. Gold owns the rights to *B.C.'s Quest For Tires.*

This form of licensing is great for a title's licensor, but causes a major problem among software companies. For example, Frantek is one of our distributors in Canada. They're a good customer and buy a lot of software. But we have to be careful not to sell them Disney or B.C. material because our agreements with Disney and Hart forbid us to export those products. This may seem minor, but it complicates software marketing and upsets some of our customers. C

Part two of "Big Name Hunting in America" examines reasons for not licensing a product, a project that could have evolved into a licensed project but didn't, and more interviews with individuals from your favorite software companies.

ADDITION MASTER

Continued from pg. 92

```
2500 PRINT"[CLEAR]PRIME NUMBERS"'BAQD
2510 PRINT:PRINT"1. TEST A NUMBER"
     :PRINT"2. LIST PRIMES"'DCNK
2520 PRINT"3. LIST NON-PRIMES"
     :PRINT"4. BACK TO MENU"'CBWK
2530 GOSUB 470:B=VAL(A$)
     :IF B<1 OR B>3 THEN RUN'JOTK
2560 PRINT"[CLEAR]ENTER 0 TO
     STOP"'BAWK
2570 PRINT:PRINT"WHAT NUMBER TO
     START?"'CBYN
2580 C=0:INPUT C:GOSUB 475:C=INT(C)
     :IF C=0 THEN 2500'IUSQ
2590 IF ABS(C)>4E5 THEN
     PRINT"...THINKING"'FGAP
2600 IF ABS(C)>4E9 THEN PRINT"THAT'S
     TOO BIG!":PRINT:GOTO 2510'HMCK
2610 IF B>1 THEN 2670'DGLE
2620 A=ABS(C):GOSUB 350'DIFF
2630 IF A1=0 THEN PRINT C"IS PRIME"
     :GOTO 2660'FJAK
2640 PRINT C"IS NOT PRIME, BEING"'BBFJ
2650 PRINT"DIVISIBLE BY"A1"AND"C/A1'C
     FNL
2660 PRINT:PRINT"NEXT";:GOTO 2580'DHXK
2670 FOR D=1 TO 22:A=ABS(C):GOSUB 350
     :C=C+1'IRKP
2680 IF(A1>0)=B-3 THEN D=D-1:NEXT'ILVP
2690 PRINT C-1:NEXT:PRINT"MORE?"'EEON
2700 GOSUB 465:IF A$="N"THEN 2500'EKVF
2710 GOTO 2590'BEND
2990 :'ABHM
3000 PRINT"[CLEAR]SQUARE NUMBERS"'BAUA
3010 PRINT:PRINT"1. TEST A NUMBER"
     :PRINT"2. LIST SQUARES"'DCWG
3020 PRINT"3. BACK TO MENU":K3=1+2E-7
     :GOSUB 470:D=VAL(A$)'HRYI
3030 IF D=0 OR D>2 THEN RUN'GEJC
3040 PRINT:PRINT"WHAT NUMBER TO
     START?"'CBYG
3050 PRINT"ENTER 0 TO QUIT"'BACE
3060 A=0:INPUT A:GOSUB 475
     :A=ABS(INT(A)):IF A=0 THEN
     3000'JWLL
3070 IF A>4E9 THEN 3180'DILF
3080 IF D=2 THEN B=INT(SQR(A-1))+1
     :GOTO 3140'JPAL
3090 B=SQR(A):C=INT(B*K3)'FLYJ
3100 PRINT:PRINT A"IS ";'CDPX
3110 IF A=C*C THEN B=C:PRINT"THE
     SQUARE OF"B:GOTO 3130'HMPH
3120 PRINT"NOT SQUARE":PRINT"ROOT
     :"B'CCCE
3130 PRINT"[DOWN]NEXT: ";
     :GOTO 3050'CGOD
3140 PRINT"[CLEAR] SQUARE","ROOT"'BBBE
3150 FOR B=B TO B+21:PRINT B*B,B
     :NEXT'HLOH
3160 PRINT"MORE?";:GOSUB 465
     :IF A$="N"THEN 3000'FMTJ
3170 IF B*B<4E9 THEN 3140'EJRH
3180 PRINT:PRINT"TOO BIG!"
     :GOTO 3010'DGDI
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END

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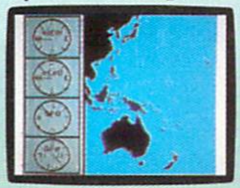
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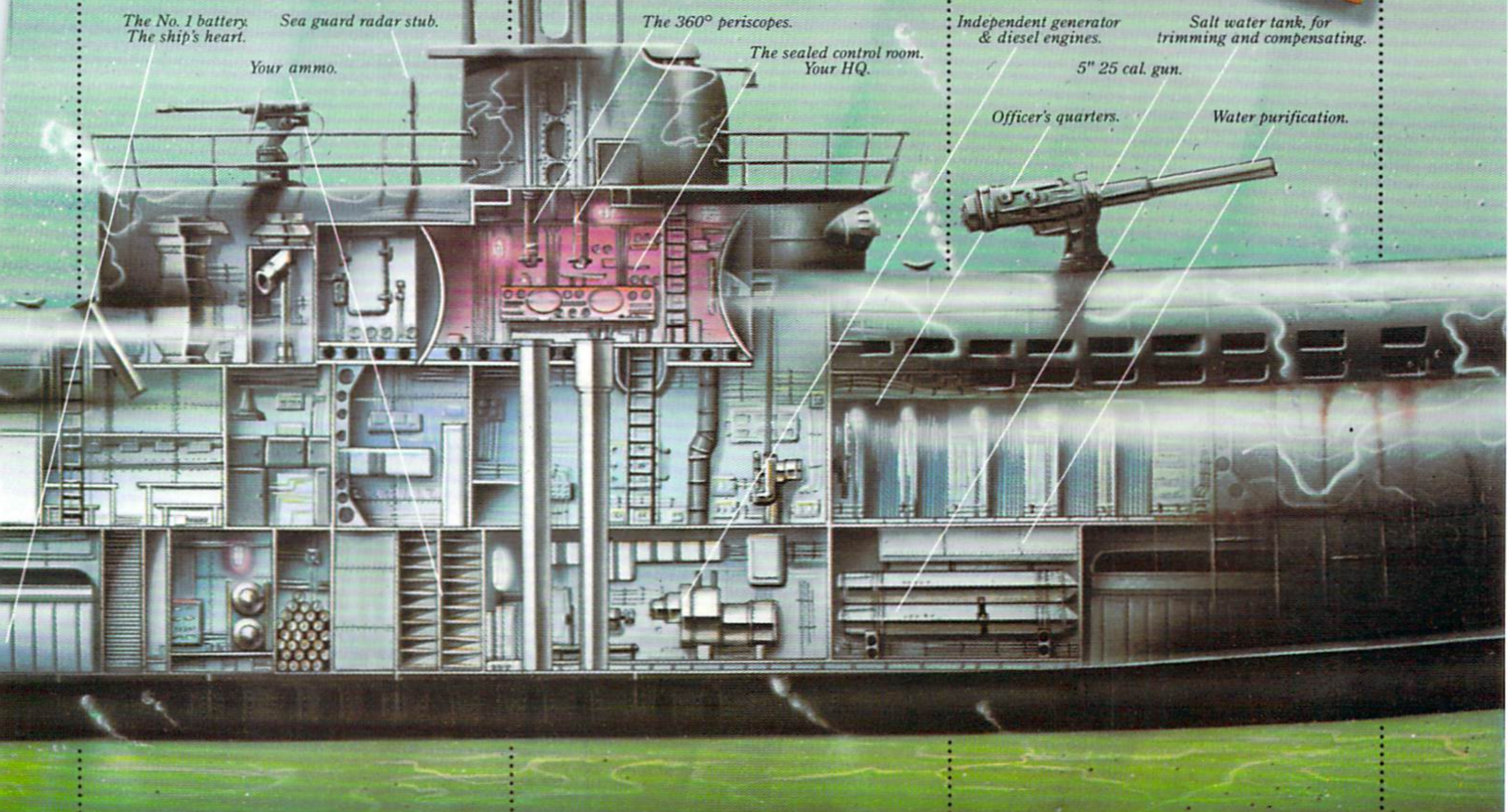
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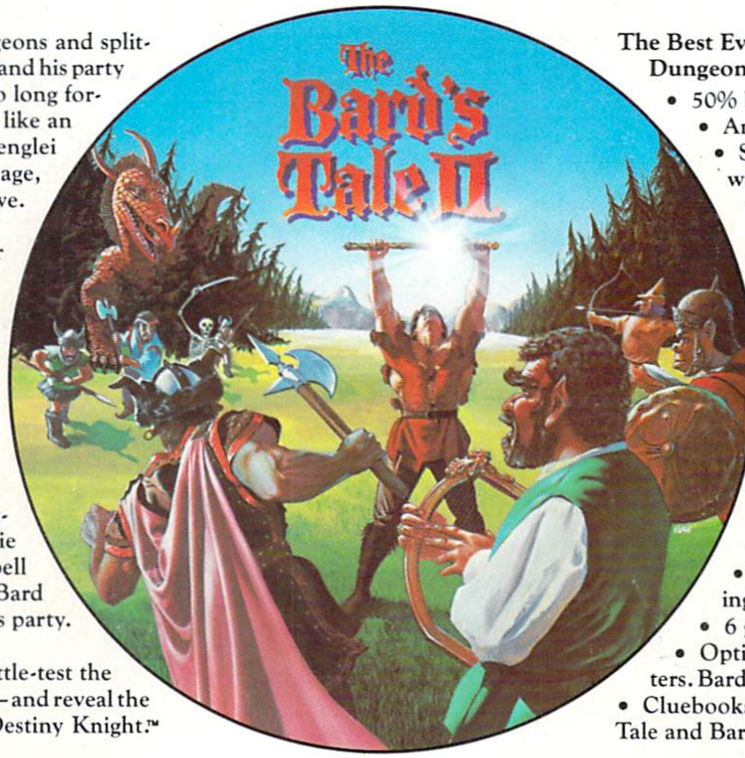
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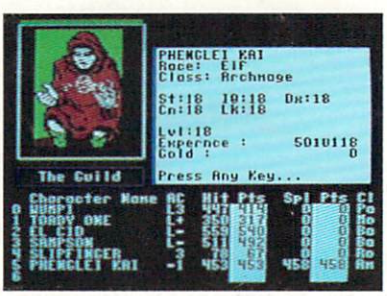
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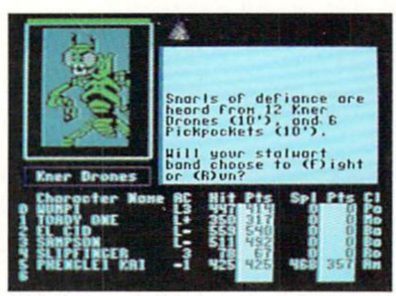


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